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HEADACHE

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HEADACHE

ITS CAUSES AND TREATMENT

BY

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PREFACE

In managing a large practice the practitioner commonly makes his diagnosis in the first few minutes of an examination by the juxta-position of one, two or perhaps three symptoms. The laborious methods of the inductive philosophy so often taught in medicine do not fit in well with the exigences of a large practice. Experience and the mode of cerebration are personal and differ in everyone, hence the general tendency for most of us to associate two or three symptoms as a short cut to Diagnosis. Headache is by far the greatest common divisor from a diagnostic standpoint in that it is present in more diseases and in a greater variety of diseased conditions than is any other symptom, therefore it seemed fitting to gather under one cover as many as possible of the symptomatic headaches.

About once in a couple of decades a treatise on this subject is presented to the medical public and as our views as to the physio-pathology of Headache have undergone much change within two decades, it seemed appropriate to present at least some of the current thought on the subject.

It will be noted, throughout, this work, that there are many repetitions of some fact or aphorism which it is easy to forget or overlook. This repetition has been intentional, because it is not likely that a busy physician will at any one time read the whole treatise, but will turn to the chapter in which he is particularly interested and without such repetition of essential facts or easily forgotten principles he may not recall having read them elsewhere in the work.

Under therapy the author has frequently touched upon diagnosis, in a conversational manner, in the belief that this association will appeal to the psychology of many and serve better to fix the essential idea in the mind of the reader.

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HEADACHE

In any discussion of headache, one must have a clear idea of what is meant when the patient says he has a headache. Headache is always a symptom, and with careful analysis it can be of considerable diagnostic value as well as of therapeutic import. The patient's stating that he has a headache may mean (1) Neuralgia, which is essentially different, and is localized, has tender points, and runs a definite course. He may mean (2) Migraine, or (3) Tic Douloureux? Patients sometimes use an unfortunate term "neuralgic headache," meaning a headache of sudden onset and great severity, shooting to the teeth, which may or may not be a (4) Sinus headache. One must further distinguish, (5) the tenderness to touch of the scalp, which is present in some individuals suffering from various toxaemias, and which has little diagnostic import. The commonest error however, is to regard the patient's complaint, (6) of a feeling of pressure, or expansion or pounding in the head, or emptiness, as headache. This sense of pressure is exceedingly common in nervous patients, and must be sharply differentiated from headache or head pain. Further, one must distinguish between head pain or headache. So that one must first ascertain if it is a real ache or pain that is meant when the

patient says he or she has a headache. Each nationality has a different way of expressing themselves, and he is the best physician who can place himself en rapport by thinking in the terms of the patient's interpretation. All these questions will be discussed at a later period. To visualize the cause and distribution of headache, a knowledge of the nerve supply of the skull is necessary.

The dura in the anterior portion of the skull, receives its inervation from the meningeal nerve, which, as well as that branch supplying the falx cerebrum, is derived from the second division of the fifth. This portion of the head is also supplied by the anterior and posterior ethmoidal nerves, which are derived from the ophthalmic branch of the first division of the fifth. The dura in the middle fossa is supplied by the recurrent branch of the third division, which after emerging from the skull re-enters the skull through the foramen spinosum. The dura of the posterior fossa is supplied by the same tentorial nerves as the middle fossa, and also by the meningeal branch of the vagus, which runs back again into the cranium through the jugular foramen. This nerve is in close relation to the sympathetic, hypoglossal and the vagus, so that this connection will be sufficient to explain many of the odd and bizarre zones of referred pain in the head that are due to visceral disease. The dura at the base has by far the most extensive nerve connections; therefore any lesion, whether it

be a tumor or Meningitis, having its origin at the base of the skull, is far more painful than when such a lesion occurs in other positions, as the top of the brain. This leads to the diagnostic formula that persistent and severe headaches are suggestive of a lesion at the base of the skull. The scalp, as far back as the vertex, is supplied by branches of the fifth nerve, also posteriorly by branches of the four upper cervical nerves. The pia receives branches from the third, fifth, sixth, seventh, ninth, tenth and eleventh cranial nerves. In the last analysis headache is a pain felt in the interior of the skull, due principally to irritation of the dural branches of the fifth nerve. The sensory branches of the vagus also suppy some nerves of sensation to the anterior three-quarters of the dura. The fifth supplies the rest of the head and neck, so that headache in general will commonly be experienced through the fifth nerve.

In general one may say that many patients inherit a tendency to become headachy on slight provocation. Possibly the inheritance of certain skull forms that readily cause pressure on sensitive meninges; such as odd shaped sinuses; or formina of unusual size, account for this tendency. It may also represent an acquired or transmitted characteristic, such as gout, with consequent changes in the foramina.

Frequency.—As to frequency, the relative frequency of the symptom headache depends largely

on the particular clientele, although it is safe to say that there are very few people alive who have not experienced a headache at some time or other. As a presenting symptom however, its relative frequency depends on the clientele. A leading neurologist gives the following proportion of patients coming for relief of this symptom:

45 Neurasthenic
6 Hysteric
17 Organic
19 Gastro Intestinal
13 Diseases of special sense

The oculist claims that 75% of Headaches are due to eye strain, but then his cases are mostly of a chronic nature. Rhinologists say that the nose is the cause in percentages varying from 40% to 60% and this appears nearly correct when acute and chronic cases are considered. In a large factory service, among 15,244 cases of absence of employees 24% of the absences were ascribed to headache. In a study of industrial medicine among department store employees, in 800 cases the order of frequency of headache as a presenting symptom in the more common complaints, is as follows:

(1) Acute infections, Croyza
(2) Constipation
(3) Poor hygiene
(4) Psychoneurosis and eye strain

In general practice most of the headaches that are seen are acute, and are associated with *fever* and Coryza, or with *gastro-intestinal* disturbances, while

the specialist sees most of the chronic or left-over cases. In any event, there is scarcely a doctor who does not, in his practice, meet every day with more than one patient suffering from headache.

Etiology.—In the majority of instances, the cause of headache is self-evident on the first examination, and it is either an evidence of toxaemia or infection. As to the rare causes, Leftwich has listed 160 causes of headache. It is in the obscure cases that we must make use of some sort of scheme analogous to a chemical scheme, in order that by some form of successive elimination we may arrive at the cause. The first step in such a scheme is to divide headaches, as to their cause, into three general classes:

Toxic
Mechanical
Functional or Reflex

and these may be further divided into Acute and Chronic or Recurring. This will materially shorten the diagnostic line. There is no hard and fast line as to this division. The same is true of any other classification. Many toxic headaches may at one time be classed as mechanical, and at another period as toxic, and so on, but in general the schema serves to orient the causes, and fix the subject in the memory of most of us, quite as well as any other division. Roughly speaking almost 50% of all headaches may be said to be due to toxic causes, 10% to mechanical causes, and 40% to reflex causes.

TOXIC HEADACHE

The toxic headaches are produced by a change of intracerebral pressure, as well as by direct action of the toxins on the meningeal nerves. Anything that causes cerebral congestion causes headache. One may visualize the mechanism as follows: The toxins of the various diseases produce dilatation of the blood vessels, through their action on the vasomotor centres, and because of this increased size of the vessels the whole brain is enlarged and exerts pressure on the meninges. Infectious diseases produce headache so commonly and so typically that the symptom headache in these diseases has considerable diagnostic value.

Toxic headaches are commonly diffuse and are not confined to any single side or portion of the head. In general, at the onset in infectious diseases, the headache is frontal, lessens in the morning, and grows worse toward evening. If the patient has ever suffered from continuous headache in any portion of the head at a previous time, then the infectious disease headache will be more marked in that region.

CONSIDERATION IN DETAIL OF TOXIC HEADACHES

Typhoid Fever.—In typhoid fever the headache is a dull, constant brow headache, and yet, if

closely questioned, it is complained of all over the head. It diminishes towards the end of the second week. When, however, it persists or increases again after this time, a complication of some kind is present, and of these complications meningitis is most to be feared. In rare cases the pain is occipital from the beginning. Typhoid fever with occipital headache is apt to be a severe typhoid. In Typhoid Fever the headache is not a severe headache, but it has a depressing effect on the mentality. This headache alone, when it lasts a week or more, in the presence of fever without any other demonstrable cause, is strong evidence of the presence of Typhoid Fever, and the onset of the headache is a convenient time from which to date the onset of the Typhoid Fever. Medicine lessens but does not entirely dissipate such a headache. Commonly the coal tar derivatives afford relief, but bathing is to be preferred; sometimes an ice bag to the head answers well.

TREATMENT.—The headache of Typhoid Fever seldom calls for treatment as a presenting symptom. The use of the formula of Acetphenetidin gr. x, and Caffeine gr. v, is usually sufficient when there is much distress.

Typhus.—In Typhus Fever the headache is an exceedingly severe frontal headache. It is the earliest symptom, and continues until the appearance of the rash; later it is followed by stupor. Excepting the headache of meningitis, it is the

most severe headache that one meets with in the infections. In the handling of large numbers of ill people, where many infectious diseases are present and where quick decisions must be made as in army camps, a good rule when in doubt, and with no characteristic symptom present, is to classify those severe infections beginning with severe headache as likely to be cases of typhus, and those with outstanding backache as an early presenting symptom as likely to be instances of smallpox.

TREATMENT.—In typhus fever, full doses, (grains x) of acetphenetidin, should be given frequently, while the headache is severe; otherwise the treatment is the same as that accorded in typhoid fever; in spite of this treatment the headache is seldom entirely controlled.

Relapsing Fever.—At the onset of relapsing fever the headache is an outstanding symptom. It is associated with pains in legs and back, and insomnia. It persists throughout the disease until the seventh or critical day, when it disappears, to return less violently with each relapse.

TREATMENT.—The treatment of the Headache of Relapsing fever is the same as that for Typhoid fever.

Influenza.—In Influenza the onset of the headache is sudden and is very severe. It is mostly orbital or frontal. When it is suboccipital it is usually accompanied by pain in the back. There

are in most instances of influenza two factors at work. (1) The toxaemia, which produces a generalized pain, which is often localized about the eye balls. Even when the eyes move from side to side severe pain results; likewise there is much soreness of the scalp to the touch. (2) In many cases most of the headache is due to the sinus infection which is almost always present. The early headache appears to the patient to be all over the inside of the head, and a feeling as though the head would burst is quite common. The sinus headache involves any or all of the sinuses, and may be frontal, supraorbital, or at the back of the orbit. (See Sinus Headache.) The head pains may be very severe, so that patients often moan or rave. These head pains are called "cruel pains" by the French; the patient holds his head clasped in the hands, and the clinical picture often simulates the onset of Meningitis. (The sinus pain is commonly on the side of the deflection of the spetum.) The head is often so sensitive that to touch the hair elicits pain.

After the first few days Influenza headache becomes less severe, although it continues as long as the first bout of the fever, which ordinarily ceases after three or four days. Short recurrences are the rule. On the other hand it is a headache which returns at the slightest cause, in many of these subjects for many years thereafter. Such recurring headache is often mistaken for the head-

ache of brain tumor. It is frequently occipital; it may reappear after any mental or physical work, otherwise the patient seems to be in perfect health. It is particularly on damp days, and when the patient bends forward that it is noticeable. In the early stages of the acute Influenza all of these headaches are aggravated by the incessant coughing.

TREATMENT.—In Influenza, Aspirin gr. x together with acetphenetidin gr. v will be found effective. It should be repeated every three hours while the pain and temperature persists. The fear of heart depression that obsesses many physicians as to these coal tar derivatives, may be disregarded. Here nasal treatment, as outlined under the treatment of Coryza and Sinus disease, may be necessary, and an ice bag to the affected portion of the head often adds to the relief.

Coryza (*Influenza*). *Headache of Head Cold.*—This very frequent type of headache presents itself in various forms—sometimes as a face ache, sometimes as an eye ache, and also as a general headache. It frequently precedes other symptoms of a head cold by several hours. It is commonly impossible to differentiate this headache from that of Influenza.

TREATMENT.—It is relieved, (1) by sneezing, (2) by an alkaline (Dobell) spray, followed by Cocain (½ of 1%) as a spray, (3) by a spray of menthol and camphor, aa gr. 2, Liquid Petrolatum

(light), one ounce, to be followed by the internal use of a purgative, and the use of the above prescription for headache. When it remains confined to one sinus then treatment is to be instituted along the lines described under the treatment of acute frontal sinusitis.

Tonsillitis.—Tonsillitis is usually accompanied by a headache similar to that of Influenza, yet as a rule it is not so severe, and it often disappears within a day or two. The tonsillar infection itself may be in a lymph follicle in the pharynx, or far down in the throat, or as a general follicular tonsillitis. A single spot, follicular tonsillitis, not infrequently makes itself felt in no way except by the headache, and a slight rise in temperature. Such a headache may last two or three days, and it will usually be classed as being due to a gastrointestinal disturbance. This common error arises because the physician looks at the throat on his first visit, and not noticing any pathology neglects to inspect it daily thereafter. These single-spot tonsillitis cases are very common in children, and unless very close and repeated watch is kept on the throat and a good light employed, they will be missed. In peritonsillar abscess there is often a parietal headache on the same side, accompanied by a sticking pain in the throat.

Treatment.—In follicular tonsillitis a prescription of five grains of Acetphenetidin, with from five to ten grains of acetyl acid salicylum (Aspirin)

every three hours during the first day or two of the disease, affords more relief than any other agent, not only as regards the headache but for the distressing backache as well.

Pneumonia.—The headache of Pneumonia is by no means a constant headache. It resembles in many respects the headache of influenza, and usually passes away after the second or third day. It is common at the onset of the disease and is made worse during the paroxysm of coughing. Sometimes this cough headache is extremely severe, and disturbs the patient more than any other symptom. It is commonly complained of in the fronto temporal region, in other patients in the parietal region, the pain running through from temple to temple. In distribution it usually follows the law of Head, i.e. the pain is referred to that area of the skull corresponding to the area of the thorax wherein the lung is affected. This subject of referred pain will be discussed later. Usually, when asked as to the location of the pain, the patient will at first describe it as a general headache. Only after questioning will he own that it follows the distribution of Head zones. One should suggest that the patient use both hands in pointing to the region of greatest pain.

Treatment.—The headache of Pneumonia is rarely a major presenting symptom. Where it is severe, a few doses of a mixture of Aspirin and Acetphenetidin, grains v, given at three hour inter-

vals usually an ice bag or cold cloth on the head, affords relief.

Malaria.—In the Malaria paroxysm, headache in some form is always present. It is generally distributed throughout the head, and is often quite severe; occasionally it is frontal.

Headache is persistent in the Aestivo Autumnal form of Malaria. In many instances periodic headache may be the only symptom of Aestivo Autumnal Malaria.

Another form of Malarial headache is Brow Ague. It is common among old malarial subjects. It is a steady, aggravating headache, recurring at certain seasons of the year, in those who have chronic malarial poisoning. Supra and infraorbital trigeminal neuralgia, are more commonly due to Malaria than to any other single cause. Such a headache usually occurs on alternate days, but this is not always so. Sometimes the periodicity of the attacks with a minute rise in rectal temperature calls one's attention to their origin. In malarial districts, no matter what else is the matter with the patient, one should always be on the lookout for these chronic malarial headaches. In passing it may be noted that the coal tar derivatives are the most generally useful agents for immediate relief of the pain in the headache of all of the infectious diseases.

TREATMENT.—The headache of the malarial paroxysm is a very severe headache. Provided

that the patient is seen during the paroxysm one should administer ten grains of Acetphenetidin with a quarter grain of Codein immediately, and place an ice cap to the head. Of course if the diagnosis has been made, before the onset of the headache, the use of Quinine will make the employment of the coal tar derivatives useless. For the brow headache, as well as for the neuralgic malarial headache, the prolonged use of arsenic in the form of from three to five minims of Fowlers Solution, constitutes by far the best form of treatment. Here, when all else fail, occasionally Warburgs Tincture is efficacious.

Meningitis.—The headache of Meningitis is sudden in onset, and continues with paroxysms of great severity as long as the Meningitis is active. When such a sudden severe headache is present, and there are other evidences of the disease, such as stiff neck and vomiting, etc., then the headache alone makes for the diagnosis of Meningitis. The headache does not however make the differentiation of the particular form of Meningitis present, as sometimes tubercular Meningitis begins with acute headache, but in general it is the cerebro spinal Meningitis that begins with a sudden attack of headache. Patients who have recovered from cerebrospinal Meningitis frequently later in life suffer from severe recurring headaches, after any severe exertion. This acute meningeal headache is one of the most severe headaches that a

human being can experience. On the other hand, when the headache begins with gradual onset, and there is increased temperature, particularly if the patient is a child, and in the Spring of the year, one is justified in suspecting tuberculous Meningitis.

TREATMENT.—In meningitis, the treatment consists in the use of the ice bag, the internal use of the coal tar derivatives above mentioned, in ten grain doses. Nearly always it will be necessary to administer morphin in full doses. Spinal puncture alone or with serum gives much temporary relief in all cases of this disease, and it should be repeated frequently.

Facial Erysipelas.—In Facial Erysipelas headache is frequent, but it is not diagnostic. It is fairly constantly present, but is seldom severe enough to be an outstanding symptom. It is usually frontal, rarely occipital. If, however, the headache disappears and then returns and continues say at the end of the first week, it suggests either Meningitis, Cerebral Thrombosis, or some other intracranial complication.

TREATMENT.—The headache of Erysipelas is alleviated to a considerable degree by the Acetphenetidin Aspirin formula, and by an ice bag.

Scarlet Fever.—The headache of Scarlet Fever is not characteristic. It passes off early. If it returns in the first week it usually means Otitis Media, or Sinus disease. If it recurs in two or

three weeks and continues, it usually means that Nephritis is present.

TREATMENT.—In Scarlet Fever cool sponges and an ice cap are quite efficient at the outset. The treatment of the latter attacks is described under the appropriate headings.

Dengue.—This disease always begins with headache as an accompanient of the bone pains; the head pain is very severe, especially in the frontal region, and in the orbits.

TREATMENT.—A combination of Acetphenetidin, grains x Aspirin grains v, forms the best basis for the relief of the headache. The destruction of the household mosquito is of course the best preventive.

Yellow Fever.—Intense headache is the rule at the onset, usually in the front part of the head; at a later period it is more intense over the occiput. When the temperature falls the headache lessens. Occasionally there is a severe one-sided headache present.

TREATMENT.—An ice cap or ice compresses afford much relief from the pain. In many instances morphin is necessary, but as far as possible one should abstain from the use of drugs.

Smallpox.—The headache appears on the day of onset. It is frontal in location, and is fairly severe, but is overshadowed by the other symptoms.

TREATMENT.—The use of acetphenitidin and acetylacid salicylum in ten grain doses is generally

sufficient to cause relief of the headache. One should not hesitate to use a narcotic if the pain is very severe.

Syphilis.—The early headache of Syphilis is a toxic headache an is practically always due to a coincident syphilitic Meningitis. It comes on throughout the night, is constant, and yet is not exceedingly severe; is present night after night with slight intermittances; permits of sleep at intervals, and is relieved by coal tar derivatives. It is frequently a parietal headache. In late Syphilis headache is often due to an Endarteritis or Gumma, and is described elsewhere. It varies as to intensity, from a slight inconvenience to great severity. In many instances it is migratory, moving here and there, inconstant and intermittent, coming and going for years. There may not have been any external evidences of the primary disease for several years, and yet it may persist and follow the same general rules as to occurrence as the early syphilitic headaches. It is to be suspected as the cause of a Migraine beginning in a person after forty years of age, without a heritage of Migraine. Tabetic headache, while rare, is of course in this category. At times the tabetic headache partakes of the nature of a crisis. It must be remembered that certain sections of the posterior column of the cord may be free of disease in early Tabes, and this accounts for the lack of the appearance of the tabetic triad of symptoms during the early stage of the disease. In rare instances

there are bone changes of syphilis in the head, producing headache. In such circumstances tenderness can usually be elicited.

In those who work during the night and sleep in the daytime syphilitic headache occurs usually during the day. By some, this is accounted as being due to the warmth of the bed. Where the disease affects the bone in the shape of swelling of the periostium, the pressure on the skull while lying may account for the nocturnal exacerbation. Such periostial bumps are mostly noted in the frontal and parietal regions. They are often sensitive to pressure. Iodid is the remedy par excellence.

In syphilis of the convexity, in addition to the paroxysms occurring at night there is localized tenderness present. It must be emphasized that not all syphilitic headaches are nocturnal, and on the other hand that all nocturnal headaches are not syphilitic, but mostly they are syphilitic.

Treatment.—The headache of syphilis, whether it be early or late syphilis, should be first relieved, as far as possible, by ten grains of acetphenitidin, and within an hour or so, an antisyphilitic remedy may be administered. Mercury begins to show its good effects very quickly in relieving this headache, as well as relieving the other symptoms. Often within a few hours of its administration, and certainly within a week, its effects are evident. Calomel is quite the most active form of mercury for a few days, although it is not suited for a long

course of treatment. The protiodid, gr. ¼, is a good remedy for continued use. In those cases where there is equivocal evidence, or suspicion of syphilis, the use of calomel, gr. 1/10 t.i.d. is at times a sovereign remedy in relieving a long standing headache, and in the absence of any direct cause of such a headache, it is worthy of trial. The injection of arsphenamin is, on the whole, more efficacious, but if, for any reason, it cannot be administered promptly, the mercury should not be with-held. Sulpharsphenamine may be substituted, but it is much less efficacious than arsphenamin. According to Sluder, all syphilitic headaches can be relieved by cocanization of Meckel's ganglion. For the headaches of late Syphilis, iodides are more efficacious than either mercury or arsenic. The dose should be at least ten grains, three times a day, and increase progressively until relief is obtained.

Tuberculosis.—Headache is a common early symptom of Tuberculosis. It is generally charged up to the accompanying constipation and to the indigestion that is so common in the early stages of the disease. Later on the afternoon temperature accounts for the afternoon headache. It is often more of a sense of oppression than of pain. If one will think along the lines of Head zones one will find that most consumptives will complain of distress over the particular zone corresponding to the lung reflex arising from the affected portion of the lung.

A certain percentage of patients suffering from *hidden* Tuberculosis will present a multitude of symptoms fleeing from one organ to another, but with headache of varying severity constituting the sole regularly appearing subjective symptom. All of such patients present a temperature from 99 to 100 rectal, while in bed. Aside from this slight temperature reaction there is little to distinguish them from patients suffering from a neurasthenia from any other cause. If three milligrams of old tuberculin is injected, a severe reaction will convince one that Tuberculosis is the cause. Coincidentally this usually produces a local reaction. These patients present only the headache, temperature, and T.B. reaction as constantly recurring symptoms, and are generally missed, because the patient does not usually develop fatal Tuberculosis.

Real recurring headache at the period of life when pulmonary Tuberculosis usually appears, is sufficiently uncommon to call one's attention to the possibilities of Tuberculosis. In the absence of other signs of some sort of focal infection, that will account for the more or less constant recurrence of this afternoon headache, we should in a doubtful case diagnosticate away from Tuberculosis, and rectal temperatures should be taken several times daily, for a week, to find if there is any temperature elevation.

TREATMENT.—The treatment consists of an ice bag and 5 grains of Acetphenetidin, and rest.

Trench Fever.—The headache of Trench Fever is a very severe one, and is often the cause of mistaking the disease for Meningitis.

TREATMENT.—The treatment is similar to that of Tonsillitis, i.e. 10 grains of Acetyl acid Salicylicum, and 5 or 10 grains of Acetphenetidin.

Encephalitis Lethargica.—Headache is a common complaint at the beginning of so-called sleeping sickness, but it is not invariably present. Probably 70% of the patients complain of it. Inasmuch as most of the cases, as far as our knowledge goes, begin as an Influenza, the headache is classed as an Influenza headache. It is mostly a frontal or occipital headache; after a few days it ceases to be a prominent feature of the disease. As a post encephalitic phenomenon it is often in the foreground, and the distribution depends largely on what particular part of the brain has been affected by the disease. One patient complains of a supra-orbital pain; another of pain in the back of the head, and so on. It is worse in damp weather, or after loss of sleep. The suboccipital pain is made worse when the patient is excited; in some it is worse on lying down; in others it is unilateral, and sometimes it is relieved by tight bandage or by pressure. It is occasionally severe enough to demand a hypo of morphine. Inasmuch as many of these patients, subsequent to their Encephalitis develop high blood pressure, it may occasionally raise the suspicion of Uraemia as being the cause

of the headache. In some instances the pain follows the distribution of a single nerve. The supra-orbital is often affected. It is a constant steady ache, made worse by damp weather. Pain in the suboccipital nerve distribution is worse when lying down. It is mostly at night that the pain is severe, thus simulating Syphilis. Sometimes a tight bandage affords complete temporary relief.

TREATMENT.—The early pain is best relieved by the Acetphenetidin, grains 5, and Acetyl acid Salicylicum, grains 10, mixture; but if it be of much severity, Codein, ½ grain, must be added. Cold compresses to the head are grateful. At a later period Iodides and Bromides are useful agents. The prognosis is good as to its eventual cessation.

Phlebitis.—A suboccipital headache rarely marks the onset of Phlebitis in any portion of the body. Occasionally it is very severe.

TREATMENT.—The powder of Acetphenetidin and of Aspirin affords but indifferent relief, and a narcotic is generally necessary.

Gastro-intestinal Tract.—The commonest occurrence of a toxaemic headache is the headache of constipation and other digestive disorders. Various theories have been evolved as to whether the origin of the headache is reflex or toxic. The instant relief afforded by the purgative in such cases appears to be too rapid if the cause were toxic, and yet toxic products at other times often manifest

themselves within a few seconds. At present it seems that the toxic theory is on the whole the most tenable. Indicanuria is often associated with such headaches whether they be acute or recurrent. It is not generally accepted that the indicanuria as such is responsible for the headache, although many observers maintain that this is so. The onset of a digestive disturbance whether it be acute or chronic, is frequently associated with headache. It is difficult to ascribe such headaches to any specific digestive disorder. Formerly because of the frequent association of headache with acid eructations it was believed that the Headache was due to hyperchlorhydria. That position has been abandoned.

In some patients the head discomfort is rather a fullness in the head coming on after a heavy meal. This might easily be interpreted as being due to a swelling of the nasal mucosa or of the turbinates, such as usually accompanies normal digestion. In others the headache follows two or three hours after the ingestion of certain foods, such as fried foods, chocolates, etc. One may cite many such instances. In one patient a supraorbital headache comes on one hour after eating an orange; this is relieved by soda bicarb; another has pain in the temporal region after taking a glass of milk; another, three hours after partaking of beef soup; another, after chocolate. In this case this peculiarity is a family idiosyncrasy, and this family transmission

will be frequently noted if the patient is questioned on this point. For many years the headache that follows from the hurried eating of ice cream was the subject of much speculation. This is usually a left temporal headache. It has recently been proved that this headache is due to the action of the cold against the left ventricle of the heart. This in turn produces headache by a referred mechanism in just that portion of the head where we would expect any irritation of the left ventricle to cause pain, according to the hypothesis of Henry Head. (See later.)

Headaches coming at a certain regular period after meals, should always raise the question of gastro intestinal disturbance, but usually there is another secondary factor, as a large turbinate, etc. The query as to whether such a headache occurs on Sunday as well as a week day will frequently serve to differentiate between an eye headache coming on about four P.M. and a digestive one at the same hour. It must be remembered that the headache does not always follow immediately after the taking of the food. Even the abstinence from the usual cup of tea or coffee at a certain meal often explains such a headache.

Constipation and its consequent digestive disturbances constitute the cause of by far the largest number of individual headaches, although they are not, perhaps, the most common complaint from the practicing physician's experience, because

most patients have learned to recognize constipation as a frequent cause of headache, and the treatment is obvious. The experience of house physicians in sanitaria and institutions where patients are confined to bed, will corroborate this statement. It may be stated that the chief function of a house physician is to keep the bowels of his patients open.

For the most part such headaches are of gradual onset, and are not continuous. They are frontal in character, and are accompanied by other evidences of digestive disturbances, such as coated tongue, loss of appetite, etc. Frequently vertigo is also present, and there is a disinclination for mental work. In the management of any headache whatsoever, this factor of constipation should be considered as likely to be present, either as a direct cause of the headache or as an added cause. For that reason there are very few headaches the treatment of which should not be begun with a purgative. Much care must be exercised in not being deceived by this relief, because almost all headaches are somewhat relieved, at least temporarily, by a purge.

In chronic recurring headaches, constipation is usually not the sole cause of the headache. There is almost always another pathologic condition present in addition to the constipation, the removal of which other pathology is of more importance than the regulation of the bowels.

TREATMENT.—The most prompt relief follows the use of an enema. When for any reason this cannot be had, then a saline such as Seidlitz powders in a double dose, to be followed one hour later by a single dose, is sufficient. The most satisfying results follow the administration of a large dose of Castor Oil; its disagreeableness prevents its more general use. The treatment of the constipation itself involves many problems in medicine. There are many cases that do not lend themselves to hygienic rules. The practitioner will, when it is *not* possible to accomplish daily bowel movements by natural and hygienic methods, resort to his own favorite anti-constipation treatment. Some will prefer a regular dosage of mineral oil; others Cascara or Aloin, or various combinations, the essential result being a daily movement, or in some instances, a movement after each meal. In the meanwhile, for immediate relief, a combination of soda bicarb and Acetphenetidin, each grains v, is of much service.

As to Bacillus Bulgaricus, Bacillus Acidophylus, etc. Unquestionably the introduction of these baccili with milk, into the gastro intestinal tract, has been provocative of good in the relief of some few chronic headaches. The patient, and very often the doctor, rushes to the conclusion that inasmuch as an occasional headache that has resisted all ordinary means, is by this agent relieved, then the bacillary milk must be the specific cause

of relief. Close questioning of the people thus cured, show that the bacillary milk produced the first regular bowel movement that they have had in years. It is this regular detoxication due to having the bowels move that accomplishes the good results in an indirect manner.

A small but definite percentage of such patients secure relief while taking the milk or bacterial agent. In other people the digestion is often upset by these preparations. In the cure a glassful of the special milk is taken three times a day, preferably between meals, or else half of an yeast cake is consumed twice a day. This measure is worthy of trial in any patient presenting constipation with recurring headache.

When these fermented milks agree with the patient, and act as laxatives, they are of considerable use. In no other sense are they the specifics that manufacturers would like one to believe.

The headache associated with indigestion from faulty food, is best relieved by drachm doses of soda bicarb in hot water, followed by an enema, and later by a purgative. Nature secures relief quicker by vomiting, and when haste is necessary the induction of vomiting is the shortest road to relief. Persons subject to the so-called "bilious headaches," when there are evidences of liver impairment, are as a rule made worse at the seashore, and often find relief in the country. In such people the regular use of bile sats, with salicilate of

soda, is often successful in bringing about relief. The ingestion of butter, fats of all kinds, eggs and cheese and raw fruit, are harmful to this class of patient. The daily use of the formula devised by Dr. Rachford of Louisville, has at times been successful in warding off such headaches. The formula is as follows:

Sod. Sulph	gr. xxx
Sod. Salicylas	gr. x
Mag. Sulph	gr. 1
Lithia Benzoate	gr. v
Tr. Nuxvom	♏iii
Ag Dest	f℥iv

One dose, before breakfast.

It is marketed under a trade name by some of the leading manufacturers. In many forms of Migraine it is invaluable. It should be given in a large quantity of water, a half hour before breakfast. Another similar preparation suggested by Hare is marketed as an effervescent salt, and contains ten grains Strontium Salicylas, five grains Lithium Benzoate, and sixty grains of Rochelle salts. It is quite efficient in the above class of patients.

Hunger Headache.—Hunger headache is related to the headache of Anaemia. It is probably analogous to the sense of bad taste, and even of bad breath, associated with hunger in some people. It is usually relieved by tea, coffee or food. This headache is noticeable when a patient, for any reason or other, misses his accustomed breakfast. It also

follows in some people the omission of the usual tea or coffee with the meal.

TREATMENT.—It is relieved by hot, stimulating foods, and by tea or coffee. Among drugs Guarana —gr. x and Caffeine are the most satisfactory.

Uraemia and Chronic Nephritis.—The headache of Chronic Uraemia is due either to a localized edema of the piarachnoid, or to the toxins circulating in the blood. It occasionally recurs at intervals, and often closely resembles migraine. It is usually felt on arising in the morning, and is situated in the back of the head, in the sub-occipital region, rarely radiating to the front. So common and so regular is this symptom that in the case of any adult complaining of morning sub-occipital headache for a month or longer, (in the absence of any symptoms pointing to nasal disease) one should consider the kidney as the most likely cause. A frontal headache is also sometimes complained of in uraemia, but it is frequently more of a feeling of oppression than a real headache.

When in doubt as to whether the headache is renal or not, an opthalmoscopic examination should be made. This, if positive, confirms the diagnosis. The presence of a small amount of albumin in the urine, in women, is of no significance. When however it occurs in men it is of prime importance. Most of these renal headaches occur in those suffering from an interstitial nephritis, and in those patients the amount of albumin usually present is

negligible. In such cases it is more satisfactory to take the specific gravity every two hours during the day, and of the whole night urine. Inability to concentrate, i.e., to bring the specific gravity of the urine above 10.15, is considered good evidence of the presence of nephritis. If any doubt exists, the sulphonpthalein or red test, or the urea test of the urine, and a chemical examination of the blood, will suffice to clear up the diagnosis. Such a headache is occasionally confused with that of cerebral tumor, as vomiting in both is at times present. However, the other signs of either nephritis or of tumor will within a few weeks suffice to settle the matter.

All of these toxaemic headaches are made worse by alcohol, and relieved by purgatives.

TREATMENT.—The headaches of uraemia and chronic nephritis are often temporarily relieved by the use of the nitrites, particularly nitroglycerine. The other measures commonly employed in the treatment of nephritis, such as purgation, diaphoresis, etc. are in order. Diuretin, grains xv, is often a sovereign remedy. When the headache becomes a constant complaint, twenty grains of bromide or ten grains of chloral, three times a day, will often act well, until the under-lying kidney decompensation has been restored. In these chronic cases repeated active catharsis is always indicated. In some of these patients the ingestion of meat seems to induce such a headache. If, in spite of these measures, no relief is afforded, then acetylacid-

salicylicum or acetphenetidin in full doses must be regularly employed. The patient should be instructed to take these medicines as often as required. It may be contended that salicylates are not well borne by the kidneys of nephritics, but extended observation has failed to convince us of any ill effects resulting from the use of medicinal doses. It is folly to expect such a patient to have recourse to a doctor every time he has a headache. A nephritic headache is often relieved by a hot water bag applied to the head, whereas ice is apt to make it worse. Such a headache is frequently relieved by nose bleed. The use of a vibrator to the head commonly aggravates it. Sleep relieves it.

In the event that neither coal tar derivatives nor purgation relieve this headache, phlebotomy should be done; relief is often afforded for weeks and even months, following this procedure. If this is unsuccessful, then a spinal tap may be done, and twenty c.c. of fluid withdrawn. All of these measures failing, then one must resort to narcotics of the opium and chloral group.

A dull headache is not an uncommon form of headache in hypertension nephritics. In such cases a salt free diet will often clear up the headache as if by magic, and this freedom from headache can often be maintained by such a diet. (See Hypertension.)

Toxaemia of Pregnancy.—The headache of the toxaemia of pregnancy calls for immediate and strenuous treatment. When severe it should be

relieved at once by the Acetphenetidin mixture, and then elimination hastened as quickly as possible. The ordinary measures of diet, diuresis, diaphoresis and frequent purgation are all to be employed with rest in bed. In the long run such measures are usually more successful than the production of artificial labor, unless the fetus is near to term.

Puerperal Eclampsia.—Headache is often a premonitory sign of Puerperal Eclampsia. It is a dull, persistent, throbbing headache, either frontal or in the superior occipital region. Its casual appearance should be seriously considered in any pregnant woman suffering for the first time in her life from recurring headaches. It calls for careful blood pressure and urine and opthalmoscopic examinations. It is sometimes bi-temporal, and is worse before or during the time that menstruation ordinarily is due, thus suggesting pituitary disturbance as a cause; in others it is worse on waking, clearing up at noon, vertical and frontal types are not uncommon.

TREATMENT.—Active purgation and treatment, as suggested under uraemia, are to be carried out.

Exopthalmic Goitre or Graves Disease.—This headache is present on and off for weeks at a time, and because of the associated symptoms is very apt to be considered a neuresthenic headache. It is commonly noted just at the hair line.

TREATMENT.—Bromid in twenty or thirty grain doses, t.i.d. is a sovereign remedy. Chloral in ten

to fifteen grain dosage, t.i.d. or Luminal, grains two, b.i.d. are indicated when the bromides disagree. Along with these, if the headache is severe, absolute rest in bed must be included.

Simple Goitre.—A morning headache, especially on awakening, in the fronto occipital region, is common. It is relieved by hot drinks. It is also often present at the top of the head in front, at as well as at the hair line. In some cases it is felt in the posterior parietal regions. It is always relieved entirely by rest. Because of the elusiveness of hypo and hyperthyroidism, it is well to question the patient as to whether or not any headache is relieved by rest.

Treatment.—In Hypothyroidism of course the corrollary is the use of thyroid extract in small doses. Inasmuch as all of these thyroid cases, either of the so-called hypo or hyper group, are an exceedingly unstable lot, and will react surprisingly to all kinds of medicine, it is advisable to begin with very minute doses of thyroid extract, and to gradually increase the dose. The same holds true as to the use of Acetylacid Salicylicum or its immediate cogenors in these patients. Such patients may be very susceptible to purgatives; especially is this so in the presence of a preponderance of the hyper symptoms. Occasionally the use of a hypo of Pituitrin, ½ c.c. produces better results than Thyroid alone. Then the combination of ½ c.c. Pituitrin three times a week by hypo, with ½ gr. thyroid extract t.i.d. by

mouth, offers the best treatment of this headache, as well as of the multitude of other pains occurring in adults with such evidences of dysthyroidsum. The fact that many preparations of thyroid are inactive, and that a glycerin extract is usually efficacious, should be borne in mind. At times Iodine in the shape of Lugolls solution is more efficacious than the thyroid.

Gout.—The headache of Gout has no distinguishing features except that it commonly follows errors in diet, in those who are subject to gout. It is more a sense of fullness and pressure in the head than a real headache. It does occur in paroxysms, and is then difficult to distinguish from Migraine, because the history of heredity is often common to both. The pain is usually worse on arising, is present on both sides, and is not accompanied by eye symptoms. It is usually accompanied by attacks of mental depression. It is often confused with indurative headache. Formerly it was very common in the British Isles. At the present time a gouty headache, like true gout, is very rarely met with even in England. The association with big toe joint pain, or of tophi in the ears, or of a history of gout will serve to suggest its cause.

TREATMENT.—It is best treated by a calomel purge, to be followed by ten grains of Atophan or Cincophen every 4 hours and by Colchicum at a later period. Gouty persons are quite subject to such a headache, which comes with changes in

the weather, and one is sometimes at a loss to know if they are suffering from a gouty or indurative headache. A previous history of gout, in the patient or his ancestors, sometimes offers the only avenue by which one may make a diagnosis.

Diabetes.—In Diabetes, headache is a common complaint. Because of the frequent association in practice of Nephritis with Diabetes, and because headache is so common in Nephritis, this diabetic headache is frequently overlooked. It is rather a diffuse pain, or sense of heaviness. There is no relation between the severity of the Glycosuria, and the severity of the headache. Diabetic neuralgias and neuritides in the head region are not so common as they are elsewhere, but are sufficiently frequent to bear recollection. The diabetic complains of a heavy stupid feeling, with head discomfort and pressure. Usually it is associated with mental depression. Diabetic Coma is frequently preceded by a *very severe* headache, and the headache is then of considerable diagnostic and prognostic import.

TREATMENT.—In Diabetes, headache is relieved by Atophan and Acetylacidsalicylicum, in full doses, in addition to the general measures employed. Starvation, when indicated, is of great value. Insulin demonstrates its usefulness by the almost magical relief of this symptom. The use of the coal tar derivatives is of temporary value in all cases of diabetic headache. Indeed, the sense of well-being

often following their use seems to cause the temporary disappearance of most of the minor symptoms in the diabetic.

Epilepsy.—Headache almost always follows a convulsion of True Epilepsy, and is sometimes of a diagnostic value in determining the nature of the attack. This is certainly true in the history of the early attacks. It is a frontal headache, and lasts a half hour or longer. If a headache recurs frequently in the morning, with no other evidence of Epilepsy except perhaps a bitten tongue, much muscle soreness, and possibly a history of incontinence of urine during the same night, it is strongly suggestive that the patient has had a nocturnal attack of epilepsy. In a doubtful case, where there has been a history of convulsion, and no other facts are ascertainable as to the character of the convulsion, then in taking a history of the convulsion if one can elicit the fact that a severe headache, even of short duration, followed the convulsion, one is warranted in believing that the convulsion was due to epilepsy.

Except for a tight band about the head it requires no treatment.

Gall Bladder Disease.—Not infrequently a headache occurs in association with gall stones, or Cholecystitis. It is usually in the midline at the top of the head, leaving a sense of soreness to the touch after its disappearance. Occasionally it is parietal, and even occipital. According to the law of Head,

the point of maximum intensity of such a headache should be in the vertical region, midway on a line drawn from ear to ear. Likewise in persistent jaundice from any cause, a dull headache is often a regular accompaniment. Although frequently present it is rarely a presenting symptom.

TREATMENT.—The removal of the gall bladder or of gall stones, as a rule completely cures such a head pain. The other general measures such as are commonly employed in the management of gall bladder disease are indicated. Acetylacid Salicilicum in ten grain doses is generally efficacious for the acute attack of headache.

Toxic Foci.—Headache is rarely due to old pus foci, such as teeth, tonsils, etc. In spite of the present hysteria as to removal of these organs, they are in the author's opinion among the rarest causes of chronic headache.

When present, such a complaint is a dull headache that comes and goes, and is amenable to Acetphenetidin in five grain doses to be followed by removal of the focus.

Erythema Nodosum.—Erythema Nodosum is often associated with a severe morning headache, tempero parietal in distribution, usually well relieved by Acetylacid Salicilicum, grains x.

Food Protein.—The ingestion of meat in a small group of people is regularly followed by a frontal headache, that lasts from two to three hours; in others it occurs two or three hours after partaking of

beef soup. In others again, the ingestion of milk is followed by a temporal headache. In one instance there was accompanying the headache at all times, a sense of sour taste and odor coming up from the pharynx to the mouth, but not a true regurgitation.

It is often difficult to differentiate the headache due to ingestion of protein, from a digestive headache.

TREATMENT.—The simultaneous administration of an alkali with the milk or other protein, or the use of small amounts of citrate of soda, is occasionally efficacious. In others a gradual desensitization by the use of very minute doses of the protein, either by mouth or by hypodermic injections which are gradually increased, will sometimes solve the problem.

Protein Shock Headache.—The headache that so commonly is present in the protein shock reaction, following the hypodermic injection of any foreign protein, is generally temporal, and lasts from one to three hours. The accompanying symptoms are so marked that the headache usually escapes attention.

TREATMENT.—Here during the attack Adrenalin alone, or in some instances alternated with Atropine, is efficacious.

Post Anaesthetic.—Post Anaesthetic headache is similar to the headache of alcoholism, and seldom calls for any special treatment, except that a tight bandage and the inhalation of vinegar sprinkled on a handkerchief, gives much relief, and often stops the headache.

Post X-Ray Headache.—This consists of a bi-temporal drawing sensation, with real pain on the top of the head. The patient frequently states that the pillow feels like iron. The causation of this headache may be ascribed to the toxaemia that is developed in some people as the result of short or long exposure to the X-Rays or to Radium. It usually occurs in those who present other evidences of X-Ray toxaemia, such as vomiting, etc. In any case, in the absence of other symptoms of X-Ray toxaemia it is difficult to separate such a headache from the so-called neurasthenic headache. The close room wherein X-Ray treatments are frequently given, and the nervous fears of the patient, all go to produce headache in susceptible people.

TREATMENT.—Chloral in eight grain doses is a fairly efficient remedy. Bromids are also useful.

Poisons. Alcohol.—Among poisons producing headache, alcohol was formerly by far the most common cause. The headache of "the morning after" is well known, and is often a bi-temporal headache. The figure of a man holding his temples is always suggestive of "booze" headache. It is usually associated with hyperaesthesia of the scalp, and this is quite characteristic. It appears in the morning, and is a general headache; at times it is worse over the frontal region, especially when there is present also a digestive upset. Sometimes it is paroxysmal, and wave-like in character. Unaged whiskey and wines are more likely to cause it than

old vintages. Some are affected by one form of alcohol more than by others. Wine and mixed drinks are more apt to produce it than whiskey alone. Some persons are exceedingly sensitive in this respect to even small quantities of alcohol.

In general, headaches of all kinds are made worse by Alcohol. Certainly all of the nervous and mechanical headaches are made worse by its use. The headache of poisoning by wood alcohol is very severe, and is usually associated with symptoms of an irritant poison and blindness. It may be well to call attention to the fact that this form of poisoning may happen as a result of (1) Ingestion, (2) Inhalation, or (3) Cutaneous absorption of alcohol. This is particularly important in painters and those who use wood alcohol in the arts. As little as one teaspoonful taken by mouth has been sufficient to cause toxic symptoms.

TREATMENT.—The headache of an alcoholic debauch, if mild, is usually relieved by the mixture of Acetylacid Salicylicum, gr. x, and Acetphenetidin gr. v, and Soda Bicarb gr. v, to be followed within an hour by a saline, preferably a Seidlitz powder. The application of an ice cap to the head causes the patient much comfort, often a tight band about the head is grateful. If the headache is very severe, from five to seven grains of Tullys powder is often more efficacious. If one objects to giving either coal tar derivatives or narcotics, twenty grains of calcium lactate or ten

grains of Guarana may be given. In some patients, a cup of black coffee or tea is, of itself, quite efficacious; later, hot, well seasoned broth, should be given every three hours. A spinal tap is sometimes employed, but it is not free from danger in these patients.

Tobacco.—Tobacco used either in the form of smoking or by chewing, is a not uncommon cause of headache, but a tolerance to it is readily acquired. The first smoke usually causes a headache; on the other hand tobacco smoke itself is a very common cause of headache in those who do not smoke, because of its effect in causing congestion of a sensitive or diseased nasal mucous membrane, rather than because of any special poison of the tobacco. In such instances the pain is supra-orbital and bilateral. Not infrequently excessive smoking at bedtime is responsible for a chronic morning headache. Such a morning headache is usually an occipital headache, which might be considered as being due to the accompanying Smokers Pharyngitis. On the other hand snuff is used by some to open up the nose, and thus to relieve the stuffy headache of hypertrophic rhinitis.

Treatment.—The first thing to do here, as in all toxic headaches, is to stop the cause. The use of the Caffeine Acetphenetidin preparation given above, is sufficient to relieve the attack. A cup of strong tea or coffee is quite effective. If the

headache is due to the first smoke, soda bicarb, a half teaspoonful, is usually sufficient.

Lead Poisoning.—The headache of lead poisoning is usually a basilar headache, but occasionally it is a brow headache. In Lead Encephalopathy with Nephritis, the headache is usually diffuse. Occasionally in Lead Encephalopathy the headache is often very severe, and is associated with vertigo optic neuritis, and closely simulates brain tumor. In mild cases there is a sense of fullness or pressure, suggestive of the head discomfort of a neurasthenia, which is often also present. In some cases the pain is intense, and there are other symptoms, particularly of a mental character, with dullness and convulsive movements. In general it resembles a nephritis headache, and except for finding the Blue line, stippled cells, wrist drop, tremor, and the occupational history, there is little reason for considering the headache as related to anything save the nephritis. Once such a headache develops in a lead worker, even though all of the ordinary preventive measures are employed, he is exceedingly prone to a recurrence of the headache. Recent experiments show that lead remains for many years in the bones of the head.

It is associated with other signs of lead poisoning, and it closely resembles the arterio-sclerotic headache.

TREATMENT.—More must be accomplished in the prevention than in the cure. Such measures

as the following may be ordered: Regular washing and scrubbing of the hands before eating; regular daily use of magnesium sulphate lemonade; by the use of face masks among those who work in places where lead is distributed in the air; by the internal use of K.I. grains v, t.i.d. alternating with Ammonium Chlorid in 20 grain doses t.i.d. The attack itself is to be managed by the use of Acetphenetidin and Caffeine; a tight bandage around the head—this failing, by a hypo of Morphin.

Iron.—The headache due to ingestion of iron is a frontal headache, and is associated with coated tongue, bad breath, bad taste, etc. It is a dull pain, and is never very sharp. A daily saline purgative often permits the use of iron without causing this headache. After the hypodermic injection of iron salts we have not met with this headache. Thus it would seem to arise from disturbance of the digestive tract, rather than from the iron itself. However, more experience with this method is necessary before one can utter a positive statement. A temporary nervous head disturbance is occasionally noted from the procedure of the injection itself.

TREATMENT.—The headache of iron is to be controlled by purgatives, and the substitution of some other hematinic than iron, or if iron is employed, by the daily use of laxatives, or again, by resorting to the hypodermic use of iron. In admin-

istering either iron or quinine to headachy people it is best to begin with minute doses, and gradually increase the amounts. A handkerchief tied about the brow is of some service.

Iodides.—Iodides sometimes produce headache. It is often difficult to determine whether the cause is a toxaemia or whether it is due to nasal swelling consequent on mild Iodism. Often the pain is complained of in the region of the external angles of the orbits. Here the question arises whether it is not due to a swelling of the lacrymal glands, as so commonly happens in some forms of Iodism. The part remains sore for some hours after the headache has disappeared. In other patients the pain is at the root of the nose, and resembles that associated with a head cold.

Treatment.—When it is necessary to continue Iodine medication, in the presence of Iodid headache, the addition of Belladonna or Atropin, to the Iodid is sometimes efficacious. In others, again, massive doses of Iodid are sometimes better borne than are the smaller ones. Strangely enough one preparation may induce the head discomfort whereas another preparation does not produce any ill effects.

Opium.—In about half of the patients who take it, the ingestion of Opium is followed by a temporal or brow headache on the following day. This is not a severe headache, but is rather a numb pain, coming and going, lasting from ten minutes to an

hour, and recurring at short intervals. The accompanying constipation and gastric distress following the use of opium, often raises the question whether the drug or the disease for which it is used, is the cause of the headache. In many instances where morphine is employed, if it were with-held, the patient would in any event suffer from headache the next morning, yet, in the presence of a headache after morphine, it is always good practice to with-hold the morphine for a day or so, in order that one may satisfy himself that the drug was not the cause of the headache. The presence of an accompanying pruritus, especially of the nose, is good evidence that the morphine is the cause. In habitues, the withdrawal of opium, and even of chloral, produces headache. All of these headaches are made worse by taking the upright position.

TREATMENT.—Opium headache is sometimes relieved by the simultaneous use of nitroglycerine or by bromid. Active catharsis is indicated the next morning. For this purpose a Seidlitz powder is efficacious, and a tight bandage about the head is usually of much service.

Banana Oil.—The toxaemia resulting from the inhalation of banana oil, (Amylacetate) produces in some people a very severe headache. Many paints likewise produce headaches in susceptible people. The inhalation of Himrods Asthma cure, (a popular remedy among the laity), is occasionally

productive of headache. In some people the odor of peppermint in any form causes frontal headache. There are many such idiosyncrasies.

TREATMENT.—First and foremost is the cessation of the cause, and a strong cup of tea or coffee. Usually this is sufficient.

Digitalis.—Occasionally one meets with a persistent and severe frontal headache during the administration of Digitalis. It is often difficult to decide whether the headache is due to the drug or to the heart disease, for which it is usually given. Heart disease not infrequently causes severe headache, even though the heart is improving at the same time, but such a headache is usually *bitemporal*. If stopping the drug relieves the headache within seventy-two hours, and again it reappears on its resumption, it is fair to decide that Digitalis is the cause, otherwise the cause of the headache should be charged up to the heart itself.

TREATMENT.—Digitalis headache is best treated by withdrawal of the Digitalis, and by the use of the Acetylacid Salicylicum Phenacetin and Caffeine formula, as given above. Unless there is a history of drug intoleration no fear should be ordinarily entertained as to the supposed depression of the coal tar derivatives. At a later period both the Digitalis and the Acetphenetidin formula may be continued if thought to be necessary.

Salicylates.—Salicylates sometimes produce headache, but as this headache is practically always

associated with disturbances in the ear, such as Tinnitus and deafness, it is a question as to which is the ultimate cause. A similar headache often occurs after taking quinine. Patients susceptible to one of these drugs are quite likely to be susceptible to the other as well. Before writing a prescription for strangers, it is advisable to casually enquire whether medicines disagree with the person or not, but one should rarely mention the medicine that is being given to them, as the suggestion may be "father to the thought," and distress will be complained of following the dose, no matter what medicine is administered.

TREATMENT.—Sometimes the use of Bromide in dosage of grain for grain of the Salicylate, relieves or prevents this headache. When Salicylate is administered by rectum, headache is decidedly less.

Nitro Glycerin.—Nitro Glycerin produces in many individuals a very severe headache, bitemporal in character; likewise nitro powders such as are used in smokeless powders, produce a headache by inhalation, after an ordinary gun is discharged. Merely shaking hands with an employee in a Nitroglycerin factory is at times sufficient to induce a most intolerable headache. It lasts from one to twenty-four hours.

TREATMENT.—An attack of Nitroglycerin headache, may be very severe and is only relieved by full size hypodermic of Morphin. This is a headache to which tolerance can be gradually acquired by every-

one. If the drug is administered in minute doses, desensitization can be accomplished. In factories where nitrites and dynamite are manufactured, men are instructed to eat pieces of dynamite from time to time, during periods of enforced idleness. In this way the initial headaches, so common on a reintroduction into the works, is prevented.

Poisonous Gases.—Poisonous gases produce headaches, noticeably apparent among those employed in garages, and in places where gasoline engines are kept. It is closely related to CO poisoning. So many unquestioned deaths have occurred in private garages from this gas that one must take cognizance of headaches in those exposed to such fumes.

TREATMENT.—Exposure in a current of fresh air is the first measure. Occasionally a pulmotor is of much service, oxygen inhalations are indicated; a cup of strong black coffee, frequently repeated, or a hypo of Caffeine Sod. Benzoate, gr. v, and absolute mental and physical rest are indicated.

CO Poisoning.—After CO poisoning headache is always constant and severe for several hours, and it commonly persists on and off for several days. It is usually made worse by the slightest movement. In rare cases it persists at intervals for years. This headache is of some diagnostic import when one has only the patients statement that he has been gassed by coal gas.

TREATMENT.—The same treatment is to be employed as described above under poisonous gases.

Foul Air.—Foul air produces headache, but here it is often a question whether the headache is not due to a nasal obstruction, made worse by the stuffy atmosphere rather than the gases inhaled. This sort of headache is common on awakening in the morning, in those sleeping in a closed room. It is relieved by getting out in the air. Foul air is often thought to be the cause, but usually it is due in the last analysis to nasal abnormalities.

Hydrogen Sulphide will produce headache in susceptible individuals; usually these headaches are frontal, and do not persist for more than a few hours.

Considerable discussion has arisen over whether the presence of sewer gas in tenement houses, as well as the CO and other gases to be noted in high and narrow streets, are frequent causes of headache in city dwellers, as well as similar gases which are present about the ash dumps in railroad yards and furnaces.

While there can be no question as to the possibility of these causes being effective in individual cases, still unless the occurrence is regular, or is regularly associated with other symptoms of CO poisoning, such as nausea, etc. one should diagnosticate away from such gases as a cause of headache.

Treatment.—Foul air, or gas headache, is best relieved, (1) by sleeping or living in rooms with open windows, (2) by the use of the Acetylacid Salicylicum and Phenacetin and Caffeine formula. When it persists after purgation and the above, a hypo of Morphin may be necessary.

Sulphuric Acid.—In this headache the pain extends from the root of the nose to the frontal region. It is largely a nasal headache, seen most commonly in those working in rubber factories, or wherever sulphuric acid is much used, and is due to inhalation of gases.

TREATMENT.—The wearing of a suitable mask, and the presence of currents of fresh air affords the best protection against this form of headache.

Mercury Vapors.—Mercury vapors cause violent general headache. It is relieved only by rest and an opiate.

Tuberculin Injection.—Tuberculin injection is often followed by a severe headache. Phenacetin and Acetylacid Salicilicum relieve the distress.

MECHANICAL HEADACHES

Any change of pressure in the cranial cavity will produce headache. Among the mechanical causes we may consider causes existing in the brain itself.

The most patent mechanical headache is that due to Brain Tumor.

Brain Tumor.—With the very rare exception of tumor of the frontal lobes, headache is the most constant symptom of Brain Tumor. According to statistics of Sharp and Jones, in thirty-eight cases of brain tumor the frequency of symptoms is as follows:

Headache	36
Diffuse tenderness	7
Localized tenderness	4
Enlarged veins of face or scalp	12
Optic disk changes	30
Generalized convulsions	8
Localized convulsions	4
Vertigo	18
Vomiting	25
Nystagmus	7
Diplopia, Persistent or Transient	11
Changes in pulse rate	14
Cheyne-Stokes respiration	4
Psychial disturbances	15
Bulimia	6
Diabetes Insipidus	2

In the non-tumor or doubtful cases the headache is also the most prominent symptom; next in frequency are the symptoms of vertigo and vomiting. Psychical disturbances, as confusion, irritability, stupor, and a state resembling a toxic delirium, appear in more than half of the tumor cases. It is a slow but steadily progressive headache, and finally becomes intense and unbearable. Hard tumors of the brain are more apt to be accompanied by an early headache than are the soft varieties. The latter may attain considerable size before there is any pain. Any increase in pressure in the cranial cavity, such as that due to coughing, stooping, etc., aggravates it, and this is of some diagnostic value. One should always percuss the head in searching for causes of an obscure headache, because, (1) of the frequency of McEwens sign, i.e. a cracked pot note, and (2) because of the sensitiveness commonly elicited over the tumor. It is a diffuse headache, until the lesion approaches the surface, when it becomes more localized. When the lesion is near the surface the head is often exquisitely sensitive to pressure over the affected area. Headache in brain tumor begins more or less irregularly, dull or severe; when dull, periods of excitement increase it. It is migraine-like in basal growths. As the disease progresses, nature is usually kind in that she dulls the intellect and the perception to pain. It is usually worse in the early morning. Its location is often indefinite. A frontal tumor frequently

causes headache in the occiput, and vice versa. An occipital tumor may cause pain in the frontal region.

It is the associated symptoms however that make headache of diagnostic value in the case of brain tumor. Of these from a diagnostic standpoint *choked disc* is the most important. In tumors of the central convolutions and of the first and second convolutions, the choked disc is occasionally absent. It is always present in pontine lesions. Interlacing of the color fields and swelling of the disc are quite early symptoms. Vomiting is a third cardinal symptom, and is seldom absent. It is very persistent and distressing. Drowsiness and stupor are late intermittent symptoms, while narcolepsy is not uncommon. In tumors of the chiasm, pons and cerebello pontine angle, attacks of trigeminal neuralgia are frequently present. In true trigeminal neuralgia the pain is also often worse on lying down.

In brain tumor a real neuralgic pain (tic douloureux) means that a tumor is probably pressing on the fifth nerve, or its nucleus.

If the skin be tested just after an attack of pain, there is usually wide spread superficial pain all over the head. When this occurs in a tumor case one is usually justified in believing that the tumor involves the brain itself. Pain on deep pressure is valuable as a localizing sign. Deep tenderness and local pain, point to meningeal involvement.

Migraine-like headaches are especially common in brain tumors at the base. In these there are attacks of unilateral headache and vomiting. Later local symptoms, such as convulsions, paraesthesiaes, referred pains, and finally, paralysis in the course of a nerve tract, all point to the diagnosis that brain tumor is the cause of the headache. In passing it may be mentioned that motor aphasia is usually an accompaniment of the tumors of the frontal lobe. In tumors of the left second frontal convolution, there is a disturbance in walking and standing, and loss of control of the muscles of the buttock. In the left first temporal convolution deafness and aphasia occur. If the tumor is in the temporal lobe, there is usually added disturbance in hearing. In the occipital lobe there is crossed hemianopsia and hemiplegia; in the parietal lobe, a disturbance of muscle sense; in the cerebellum, cerebellar ataxia and vertigo. The regularity of the recurrence of the headache is a striking phenomenon. After the sudden and violent vomiting of cerebral tumor headache, the patient is often hungry and ready to eat. A useful preparation for the relief of the headache is the following:

Acetylacid Salicilicum..... gr. 10
Sodium Bromid..... gr. 20

After the headache has become severe the action of the drugs is less marked.

All factors making for pressure, as bending forward, riding in autos, straining at stool, coughing,

etc. aggravate the pain. In Cerebellar Tumors and often in frontal tumors, as well as in those occurring in the occiput, tenderness to percussion plus the subjective pain in the same location, is of much value in diagnosis. A peculiar greenish white complexion is present at times. Usually there is also some other reflex sign, such as Oppenheim, Babinski, etc.

The pain in tumor is always referred to the interior of the skull. The patients often say they feel as though the head would burst. Suicide is a not uncommon end. Children seem less sensitive than adults, probably because of the greater mobility of the cranial bones. Often the pain disappears for weeks at a time. This is especially so if the tympanitic note described by McEwen is also present.

Cerebellar Tumors.—The headache is usually severe, and is occipital or frontal in distribution, and generally along a line drawn between these two portions of the head, with tenderness over the occiput. It is more persistent in cerebellar than in cerebral tumors, and generally worse in the morning.

In any of these locations tumor may cause Jacksonian epilepsy. On the other hand, it is possible that one may have severe headache, optic neuritis, vertigo and nausea, without brain tumor. Such a condition sometimes occurs in multiple sclerosis and in lead encephalopathy. In chronic nephritis severe headache, neuro retinitis and vertigo with nausea are

common accompaniments, and may easily be confused with cerebral tumor, so that in any case frequent blood and urine examinations are necessary.

In cerebellar tumor there is apt to be superficial tenderness over the occiput, running down the neck. This neck involvement seldom occurs in cerebral growths. Occasionally this tenderness extends through into the fronto nasal region. One should always search for the maximal point of tenderness.

TREATMENT.—In the treatment of any kind of Cerebral Tumor, whether Wasserman is plus or minus, large doses of Iodids should be administered. If Syphilis is known to be present, or suspected, the dose should be run up to as much as an ounce a day, meanwhile alternating with mercury and a course of Salvarsan. Occasionally there is no result until a Salvarsan injection is given. In some instances salicylates and Aspirin are of service, finally frequent lumbar puncture and a decompression operation may be necessary.

In Cerebral Tumor Urea and Hugson administered 20 c.c. of a solution of 30% Sodium Chloride intravenously. For the first five minutes a burning sensation was noted. The head pain then absolutely disappeared. The relief of the headache lasted in some instances from ten hours to two days. An intravenous injection every third day often kept the patient free from headache. A somewhat similar relief was afforded in the headache of syphilitic meningitis. Some relief is afforded by the

internal use of Keratin coated tablets, six five grain tablets of Sodium Chlori by mouth repeated every 3 hours.

In most instances sooner or later a narcotic with or without Acetphenetidin is required. Leeches to the mastoid will from time to time relieve the pain. Surgically a decompression operation on the opposite side at least should be attempted as early as possible after the diagnosis is unquestioned. The removal of such tumors should not be attempted en masse; rather by morcellement.

Meningeal Congestions.—In all severe congestions of the meninges, brain tumor, etc. from whatsoever the cause, a lumbar pucture and drainage of from ten to twenty c.c. of C. S. fluid is indicated. It affords relief for hours, and even for days, and is a good temporizing measure.

Cerebral Abscess.—With the exception of abscess in the frontal lobe, headache is the earliest symptom of brain abscess, no matter whether it be due to the ear, to injury, or to metasteses; these latter are more likely to come from the lungs, as a result of bronchiectasis or lung abscess. When the process is acute the pain is intolerable; it comes in paroxysms and lasts varying intervals.

Generally however, the pain is not as severe as in the headache of tumor. Although localization is not always possible, and a general headache is complained of, still in general the pain is more severe on the side of the head where the abscess is located.

In acute abscess there is usually the history of severe injury or of nose operation or of an acute otitis media. In acute abscess of the brain the headache appears early. In children it is very severe; the child bores its head into the pillow, or butts its head against the wall to get relief. In chronic encapsulated abscess the severe pain does not become manifest until meningitis develops. In temporo sphenoidal abscess without other acute infection, headache is not a prominent complaint, rather th re is a dreamy "don't care" attitude, although when questioned as to whether he has a headache or not generally the patient will answer in the affirmative.

Inasmuch as temporosphenoidal abscess is the commonest type of cerebral abscess met with in practice, the history is of first importance. The previous history of abscess of a temporosphenoidal lobe is generally quite characteristic. An old suppurative chronic otitis media is followed by a period of quiescence of months and perhaps years; a fresh relighting up of the otitis media is sufficient to call ones attention to the brain, the abscess having been quiescent for months and perhaps years.

When the diagnosis has been made, and there is localized sensitiveness to percussion over this area, it is usually good evidence that the abscess is located beneath. This localized tenderness over an area is of greater value in the diagnosis of abscess than of tumor. Anything that increases cerebral

tension, such as coughing or sneezing, or defecation, increases the pain. After defectation there may be temporary relief. In the chronic brain abscess there may be a long period of latency, with few or no localizing symptoms.

In arriving at a conclusion it must be remembered that chlorosis, as well as thrombosis of the superior longitudinal sinus, may also present optic neuritis as a symptom. Rarely only psychic symptoms in addition to the headache may be noted, and the picture may mimic general paresis. So apt is the chronic abscess likely to simulate other brain pathology that in any unexplained headache, with the usual symptoms of brain tumor, and in addition psychic symptoms, the patient must be examined with the view of the possibility that there is an abscess of the temporosphenoidal lobe. Intermittent temperature rises are of some help in arriving at a conclusion. Increased temperature is not always present, and its absence is always confusing. The eye signs are not so generally present as in tumor. Generally there is some clue as to the origin of the abscess.

Frontal Lobe Abscess.—The presence of infection of any of the sinuses should always make one think of the probability of brain abscess. This is especially true of the frontal sinus. Persistent frontal headache with such an infection, along with good drainage is strongly suggestive of frontal lobe abscess. Of course the ear is the commonest

focus. In the right temporo sphenoidal lobe all symptoms pointing to the location of the abscess are often absent. Abscess and cysts are often tender to percussion, but in general, percussion is of greater value in eliciting a general headache than in localizing the cause of the same. In general it may be said that the cause is either, (1) middle ear disease, (2) frontal sinus disease, (3) cranial trauma producing either local sepsis or a fracture.

In the rare cases due to metasteses from chronic infection in the lungs, there is little information to be derived from the headache as such. Ordinarily in such cases temperature is present, and the knowledge that such a focus is present would of itself be suggestive.

The treatment is essentially surgical.

Cerebral Concussion.—The headache associated with cerebral concussion is often very intense, and is apt to last for weeks, and even months. It may also result from falls on the spine transmitted to the head. It follows soon after trauma, and is most frequently located over the site of the injury. Occasionally however, it is on the opposite side of the head. It may be due to fracture of the inner table, or to a gross lesion of the brain itself. Often the dura is lifted up by the hemorrhage. Sometimes adhesions form between the dura and brain and remains as a chronic lesion. For that reason, for years thereafter, mental excitement or physical movement are apt to aggravate the headache.

Anything that raises blood pressure increases such a headache. In all such cases when doubt exists, X-Ray pictures should be made. Sometimes they are successful, in others no information is acquired. Ventriculography may be employed here as well as in tumor of the brain.

When concussion occurs in a brain already arteriosclerotic, headache is an almost constant concomitant. It is then commonly associated with dizziness and weakness.

Percussion is apt to be painful over the affected side of the head, and is fairly well localized. In a few cases the pain is diffuse. Often it is associated with other signs of cerebral mischief, such as vomiting or vertigo, especially is this so on making sudden movements, and there is a curious disinclination for mental effort. In many instances tenderness over the affected area persists for years after the injury, and any mental upset or physical disturbance, whether it be a fall or a fever, causes a return of the pain at the location of the trauma, or sometimes in the muscles supporting the head. Curiously enough, the scaleni and sterno mastoid are often described as being weak and tired and there is a wish for Head Support. These headaches are usually worse after the ingestion of alcohol. In the one who is already a victim of cerebral arteriosclerosis, this Headache is very obstinate, and is very difficult to relieve. These headaches are of great import because of their medico legal relation

in compensation cases. They are particularly apt to be associated with other nervous phenomena, and one is very prone to regard the headaches as just one more symptom of a traumatic neurasthenia, yet often enough there may be real pathology back of the headache.

When the complaint is of a band-like feeling, or sense of pressure or emptiness rather than pain, it is quite probably that the cause is psychic rather than physical, but of the certainty of this we can rarely be positive.

Localized tenderness and pain on percussion are in favor of head injury. Old people are so prone to have persistent headache after head injury that one is surprised when they do not complain of it. Presumably the attendant local arterio sclerosis is the determining factor. This headache is often relieved by a tight head band. Some of the concussion headaches, persisting for long period of time, are due to cerebral edema, and relief is afforded by repeated lumbar punctures. In rare instances decompression has afforded permanent relief. When seen shortly after the accident these headaches are relieved by absolute rest; the rest should be continued as long as there is the slightest pain on sudden movement of the head.

It is a good rule to follow that any head injury sufficient to cause severe headache should demand a very prolonged rest in the recumbent position.

It is often argued that a settlement of the claim relieves the headache, and while this is occasionally true, it by no means always follows, but the patient complains less of the pain, as he feels that there is nothing else to do about it, and his physician then reasons that the settlement has cured the headache.

In actual head wounds with intact skull and small defects, headache is often more frequent and more severe than when there are large defects in the skull. Headache is more common in injuries of the frontal and temporal regions than in any of the parietal and occipital regions. A very severe form of headache occurs in wounds of the vertex, especially when they are in close proximity to the superior longitudinal sinus. A foreign body within the skull, particularly in the ventricle, is generally accompanied by chronic headache.

If the headache is associated with hemorrhage into the ventricles, lumbar puncture affords relief. Of course the bloody nature of the fluid is of great diagnostic value. Too often one charges up a bloody spinal fluid to faulty technique.

Quite similar in many respects to the headache of concussion is the traumatic headache. This is a long standing headache, often due to former trauma. Other fatigue symptoms are usually present. It is not an ordinary headache, but a dull pain, with numbness, tingling, etc.

The remedies of service are, (1) Aspirin, (2) Bromid in twenty grain doses, every three hours.

Every effort must be made to relieve the symptoms as far as lie within our power. Here first and foremost one must employ frequent saline purgation, no matter what the cause may be. Straining at stool increases the headache, and it must be prevented at all hazards.

Injuries.—Late disability after injuries to the head, causing queer sensations or headache, are in 75% of the cases due to organic changes of the dura or meninges. In such cases, after waiting for at least six months, surgical means for the removal of such defects should be seriously considered, as they are frequently successful when medical means and rest have failed.

Cerebral Congestion.—The headache of ordinary cerebral congestion from any cause, is best relieved, (1) by a saline or by calomel, (2) by a hot foot bath, (3) by leeches behind the mastoid; (4) by venesection, (5) to some degree by acetphenetidin, (6) by morphin (7) by Lumber Puncture. When one ordinarily pictures this type of headache the vision of a full blooded plethoric person appears—one whose vessels seem ready to burst, and who is generally quite stout. Blood letting would be the ideal measure, but at the present time is generally reserved as a last resort. The other measures should be tried first in the above order.

Lumbar Puncture Headache.—In upwards of 50% of all cases of lumbar puncture, a lumbar puncture headache follows within a few hours up to

a day after the lumbar puncture. When it does occur it is always present when the patient sits up, and disappears completely when he lies down on the flat of his back. It is a severe throbbing headache that is complained of in the frontal and occipital regions. There is no drug that will lessen the pain sufficiently for the patient to be up and around. It commences within half a minute of his sitting up, and requires about the same interval to subside. The condition continues for from a few days to a week, and exceptionally longer, and then ceases abruptly, within twenty-four hours. The cause of the headache is not certainly known. It is believed that the loss of spinal fluid is in the last analysis the cause of the headache. MacRobert is of the opinion that the spinal membranes follow the withdrawal of the needle in its passage out through the dura, and, thus acts as a seton, and drains away a large amount of spinal fluid, and also prevents the rapid healing of the hole in the dura. He believes that the loss of fluid takes away the cushion or water bed at the base of the brain and thus favors the production of headache. Such a condition is quite likely to be the cause of the headache, as this loss of a cushion is noted only when the head is in the upright position. It has been the author's experience that it is not often present in luetics, but this is questioned by MacRobert. The use of a very fine needle in doing lumbar puncture has been suggested as the best means of prevention.

The only treatment is prolonged rest in the recumbent position.

Pituitary Headache.—Since the work of Cushing much attention has been paid to the Pituitary as a cause of headache. Certainly the description of the patient that he had a bursting sensation in the middle of the head, deep in the head behind the eyes, and bi-temporal, associated with some known syndrome that accompanies a known enlargement of the pituitary, such as occurs physiologically in menstruation or acromegaly, would strongly suggest the enlargement of the pituitary as a cause of these headache.

These headaches are usually quite severe. They are bi-temporal, and may be visualized as being due to distention of the pituitary envelope. The theory postulates that the sella tunica of such a person when subjected to any distention is too small to accommodate the enlarging gland, or, in other words, the gland is closed in. Pressure against the bony structure causes the headache. The newer concept that several regions of the brain adjacent to the pituitary are endowed with functions similar to those of the pituitary, does not invalidate this explanation, because the enlargement of any or all of these pressing against the base of the skull would accomplish the same result. Such an explanation also accounts for the headache of the Migraines, on the basis of the cyclical enlargement of the pituitary.

In tumors of the Pituitary of course choked disc is present. In some instances while in the upright position the headache is worse. In order that one may make a diagnosis of Pituitary headache there must be present some distinctive sign or signs of Pituitary disease or dysfunction, that cause enlargement of the Pituitary or its equivalents. In the first group are, (1) a broad forehead, with prominent supraorbital regions, (2) overlapping teeth, (3) changes in the secondary sex characteristics, (4) amenorrhoea, (5) impotency, (6) nocturnal polyuria, (7) decrease of libido, (8) easy fatigue, (9) mental retardation, (10) sterility, or a pituitary psychology. By this is meant, (a) that males have the psychology of females and the reverse, or (b) an abnormal fondness for sweets, (11) rapid and constant muscular fatigue, etc. (12) rapid increase in weight, (13) loss of interest in the ordinary affairs of life, etc. Such misplaced characteristics are constantly being described and elicited, and within a few years will of themselves fill a fair sized volume. Occasionally in men this headache is associated with impotence, and with painful menstruation in the female. It is mostly a posterior lobe insufficiency. The bilobar cases and the anterior deficiencies are commonly associated with hypothyroidism, and then the headache cannot be differentiated. It is believed that the attempt on the part of nature at the menstrual period in causing enlargement of the gland is the

cause of the headache, and the feeding of the gland to make up the deficiency and lessen the need for such enlargement, is the general physiologic reasoning for the internal use of the gland, although thus far this latter portion of the theory has not been a complete success.

Such headaches closely resemble the headache of Migraine and Epilepsy. Occasionally there are associated disturbances in the sense of taste and smell, which are strongly suggestive that the Pituitary is at fault. For the most part they occur a day or two preceding menstruation, or at ovulation 12 days after menstruation which affects the pituitary, and grow worse during that period. There are often symptoms of vertigo, fainting spells and polyuria present. Sometimes these symptoms are present during menstruation, without the headache or vice versa. The headache frequently disappears during pregnancy; especially is this so after the fourth month.

In tumors of the Pituitary there is often telescopic vision, and contraction of the field of vision. These are frequently the first symptoms that suggest Pituitary tumors. Finally the X-Ray usually shows the abnormality of the sella turcica resulting from tumor erosion.

Pituitary headaches are often made worse or brought on by the ingestion of large amounts of carbohydrates. In general one should *not* make the diagnosis of endocrine headache unless several of

the well known stigmata of endocrine disturbance in the organism are present. This statement applies as well to thyroid as to Pituitary disease. On the other hand it is always quite possible to have two or more factors present whose combined action may account for the headache. In general one accuses the endocrines as a cause of the headache, largely by a process of exclusion.

TREATMENT.—Pituitary headache is to be treated by the same measures as the headache of cerebral congestion, as well as with the use of Pituitary extract, both anterior and posterior; in the case of women by the securing of mental and physical rest at the time of menstruation, and finally in severe cases one must consider surgical measures for relief.

The hypodermic injection of whole Pituitary extract or at times of extract of the anterior Pituitary, have been employed with success. At the present time these substances should be tried in their order, the physiopathology of the function of this gland not being sufficiently clear enough to be dogmatic.

Syphilis of the Brain.—Syphilis of the brain itself, as distinguished from acute cerebro-spinal syphilis: The pathology of syphilis at this stage is, (1) either as an endarteritis, (2) gumma, or (3) sclerosis. The cause of the headache in early Syphilis is a Syphilitic Meningitis. In late Syphilis Cerebral Endarteritis is the commonest cause. Like the headache of Endarteritis from any other cause, the headache

comes and goes, and has fairly definite localization. Gumma is relatively uncommon. Sclerosis is still more uncommon. In the early stages of chronic Syphilitic Meningitis, headache is the rule. There are in addition, often mental changes which closely resemble Paresis. The headache is of a boring type, with tenderness to percussion. In the latter stages Ptosis and other eye signs are commonly present. The subject of acute Syphilitic Meningitis is discussed elsewhere.

Usually Cranial Nerve Palsies are early diagnostic criteria. However, unlike other tumors, the symptoms come and go for long periods of time. The pain is generally worse at night, whereas in other tumors it is often less at night. Nocturnal exacerbations, while commonly so, are not always syphilitic. The pain is made worse by exertion of either body or mind. At times it follows coughing, sneezing, etc. and spreads over the whole head, localizing itself after five or ten minutes, at a point back of the eyes. Such attacks last from two or three hours, and are often very severe.

In Basilar Syphilitic Meningitis, the pain usually involves the whole head, yet it is occasionally localized in the ocular or frontal region. When the disease is largely confined to the convexity, pain is generally located in the parietal region. At this point tenderness to pressure and percussion are the rule.

When the meninges over the convexity are involved, the occurrence of Jacksonian epilepsy,

pareses of varying degree, or disturbances of speech, etc. often are present. In ordinary cerebral arterial sclerosis, a similar picture is often presented, and may in general resemble the multitudinous phenomena of syphilitic arteriosclerosis. The spinal Wasserman must in the absence either of a definite history of lues, or of a blood Wasserman, be done, as it is not infrequently positive when the blood is negative.

When one's attention is drawn to it, it is surprising how often we find a peculiar cachexia, as well as a peculiar facial appearance in nervous syphilis.

In arriving at a conclusion, other evidences of Syphilis must be looked for, such as Landouzys scars in the mouth; (these are minute whitish scars one quarter or one third inch long, at the corners of the mouth in the mucus membrane), or other evidences of leucoplakia, *hard* testicle, etc., penile scars, the Wasserman, the Argyle Robertson pupil, as well as disease of the cranial nerves, particularly the sixth nerve.

It may not be amiss here to call attention to the fact that a positive history of Syphilis is sufficient evidence of the presence of the disease. After the presence of Syphilis for three months, once Syphilis always Syphilis. The practice of doing a Wasserman in the presence of such a positive history, is much like looking at a negro and asking him if he is a colored man. A negative blood Wasserman means nothing, and does not in any way exclude Syphilis.

It should be kept in mind that Endarteritis may occur quite early in the course of Syphilis. In fact during the first few years of Syphilis, Hemiplegia is not uncommon. This headache of syphilitic Cerebral Endarteritis is usually confined to the mid-vertex or parietal regions, and disappears on the occurrence of the Hemiplegia. This is also true of arteriosclerotic pains in the head that occasionally just precede any Hemiplegia. A point of some interest is that this syphilitic Hemiplegia in most instances does not disturb consciousness, and is fairly amenable to treatment. Persistent headache in a young or middle aged adult, when not an inherited fault, without trauma or other evident cause, is suggestive of Syphilis. Syphilis of the bone presents the same symptoms as Brain Tumor.

It is almost a cardinal rule that every tumor of the brain, and every Meningitis non-bacterial in origin, should be regarded as syphilitic until definitely proved in every possible manner to be non-specific. Migraine itself is frequently mimicked for months by general paralysis of the insane. In fact such migraine headaches occurring for the first time at mid-life, are at least strongly suggestive of General Paresis. They do not have the family history of heredity, have no aura, and as a rule are not associated with nausea. In any event such causeless recurrent headaches are all to be regarded as specific until proved otherwise. In these cases, in addition to the signs above mentioned, increased

liveliness or loss of the knee jerk, dribbling of saliva, palatal anesthesia, and troubles in speech, inability to recite alliterative phrases, etc. are the criteria pointing to the presence of paresis. The cause of the headache is probably in the last analysis due to compression of the dura.

When Gumma is present the pain is referred to the diseased side, is circumscribed and often attended with nausea and slight rise in temperature. On the other hand, in many instances, the only early symptom of Gumma is a diffuse and persistent headache, to which is added at a later period other symptoms and eye changes. When the pathology occurs at the base, cranial nerve palsies or trifacial neuralgia may call ones attention to the cause.

Pachymeningitis Externa.—In typical cases of this comparatively rare disease, the onset is with headache and delirium followed by signs of intra cranial pressure, and usually by slow irregular pulse, vomiting, sluggish pupils and choked disc. In other words, the signs are those of a tumor, developing rapidly in one who was already a victim of one of the usual causes of Pachymeningitis, such as Lues or Alcoholism. Meningeal changes of an analogous type are often doubtless due to sclerosis of the cerebral vessels, and are thus the cause of some of the localized arterial sclerosis.

Pachymeningitis Hemorrhagic Interna.—The headache of Pachymeningitis Hemorrhagic In-

terna, affords very little clue from a diagnostic standpoint, except that there is a history of alcohol or Lues, or of such causes that ordinarily are productive of the hematoma involving the layers of the serous membrane of the brain. In general it resembles the picture of Pachymeningitis Externa as far as the headache and associated symptoms are concerned.

Ear Headache.—Middle ear suppuration confined to the middle ear, rarely if ever, produces headache. In Middle Ear Disease the headache, if present, is in the vertex, or temporal or mastoid regions. When the primary disease extends beyond the middle ear, headache is a very common symptom. After opening the drum some tenderness usually persists about the ear, but if the orifice becomes blocked up again, pain in the temporal region is often complained of. In any case, persistence of the headache after a paracentesis, which remains patent, points to extension into the mastoid. After the Otitis has lasted for several days a headache occurring without due cause is a serious matter, because of the liklihood of development of sinus thrombosis. Of course one must remember that a recurrence of temperature and headache may be simply the recurrence of the Influenza or other disease, which is the common basis of such ear abscess. Relapse is the second name for influenza, and this might well be the cause. Careful inspection of the temperature chart as to the presence of

the recurring three and one-half days of fever of Influenza, is of much value, while the continued presence of the signs of Influenza in the mouth is of considerable corroborative value. Often these headaches are frontal, or are on the same side as the abscess. In these patients the pain is not always referred to the ear.

Wax in External Auditory Meatus.—Likewise, impacted cerumen in the external auditory canal, when associated with a swelling of the mass because of solutions entering the ear, causes a feeling of discomfort, which in some patients may be translated as actual headache. As has been said before, in some patients, discomfort radiates so much and so severely as to amount to actual pain, which is often referred to a great distance, whereas in others the discomfort is localized, and is negligible.

Furuncle in External Auditory Meatus.—Furuncle of the auditory canal does, in addition to the local pain, produce a superimposed headache in the Parietal region in many patients. When the Furuncle is opened the accompanying headache likewise disappears. When opening is not possible the insertion of a drop or two of carbolic acid into the summit of the Furuncle through a tooth pick or even by a hypo syringe needle is commonly sufficient to cause early resolution and relief of the headache.

Cholesteatoma.—In Cholesteatoma, when liquids are dropped into the ear, severe headache is

complained of, because the solution gets into the tympanum. This increases the size of the masses of Cholesteatoma, swelling up and impinging on the walls of the cavity.

Mastoiditis.—When headache alone is present in a mastoid suspect, one must always remember that other sinus involvements are likely to be present and are quite as likely to be the cause of the headache, unless we have proved it to be otherwise.

In Mastoiditis, the pain is usually on the same side as the lesion; occasionally it is bilateral, and is then purely a toxic headache, a point of considerable value in diagnosis and prognosis. In some chronic mastoids, periodic recurring headaches occur. In these the attack is frequently inaugurated by some systemic or functional disturbance. The relatively slight complaint of headache by the patient, which he has come to consider as almost normal, often misleads the practitioner. We have seen several such cases, wherein a chronic mastoid, the cause of a brain abscess, has been entirely overlooked as the cause of a persistent headache, until an exhaustive examination near the end of life revealed the ear as the cause. The most common of such extra aural conditions causing headache in ear disease is, (1) abscess of internal ear, (2) abscess in the brain or about the dura or various sinuses, (3) extra dural abscess, (4) lepto meningitis, (5) cerebral abscess, and (6) meningitis in one form

or other, and (7) cholesteatoma. In all of these inflammatory conditions, headache, either local or general, is invariably present. In every long continued headache due to ear disease, the thought that it may mean temporosphenoidal abscess, should be kept in mind, and an attempt made to elicit a history of a former abscess in the ear.

Tension in the middle ear causes pain, either in the temporal or parietal region. Retraction of the membrana tympani, whether it be due to a late or a new process, frequently causes a general unilateral headache, which commonly is expressed as a sense of numbness or a sense of weight, rather than pain. A headache due solely to this cause, is relieved by inflation. Many long standing suppuration in the attic, and also in cases of Cholesteatoma, with little or no discharge, which one may easily overlook, there often arises a pain that is first localized in the head above the ear, and then becomes general. Curiously enough, these patients have suffered so long from a discharging ear, that they consider it almost normal. Removal of the ossicles commonly relieves this headache.

In this connection it is always well to remember that possibly the most patent cause of a headache may not be the cause in that particular instance. This is well illustrated in the headaches that follow mastoid operations. The neophyte is always ready to regard the ear or the meninges as the cause of a headache occurring after the operation, yet very

frequently such a headache may be due to congested turbinates, irritation by ether, or to a gastro-intestinal toxaemia.

It is the general opinion among otologists that in labyrinthine suppuration, headache is constantly present, while in serous labyrinthitis it is commonly absent. This is a rare problem in otology. In all of the abscesses about the dura, the headache is localized, and is more severe over the site of the lesion, and the spot is tender to percussion. When the brain itself is involved there is present a dull heavy headache. When in addition a superficial headache due to any of the extra aural causes mentioned above is also present, confusion readily occurs. In these deeper abscesses the headache is commonly dull, and is not always associated with these local pains and tenderness to percussion. In these cases the pain may often be referred to other portions of the skull, just as in cerebellar disease, where the headache is often frontal in character.

The headache of suppuration and Serous Meningitis, is always severe, and is aggravated by sensory impressions, as light, sound, etc. In inflammation of the veins of the head, such as the longitudinal sinus, unless the dura is involved the headache is not usually severe. It is important to remember that headache, local or general, especially when diffuse, in connection with ear disease of any kind, and after thorough drainage, should make one

feel that it is extremely likely that there is some complication within the skull.

In any earache when there is a complete absence of signs pointing to pathology in the ear, one should remember to examine the region of the hyoid bone. If this reference area of head is disturbed for any reason, whether it is because of local pathology, a goitre, etc. or merely a way station, as it were, acting as a central distributing centre for the pain of a diseased lower second bicuspid or molar tooth, then the pain is referred to the ear and temporal region and the patient complains of earache, even though there is no pathology in the ear itself. Likewise, pain just posterior to the mastoid may be due to Sluders neuralgia. (See Sinus Disease.)

TREATMENT.—The treatment of aural disease is naturally bound up with the treatment of the primary disease. At the first onset Calomel in divided doses should invariably be prescribed and repeated. Aspirin should under no circumstances be employed. Acetphenetidin is safe, and usually useful, otherwise the treatment is surgical.

Otitic Sclerosis.—Chronic Otitic Sclerosis is often accompanied by a generalized headache. Whether it be due to the Otitis, or to the usually associated throat and nose conditions, will always be a mystery.

TREATMENT.—Pollitzerisation affords considerable temporary relief. Inasmuch as the attacks of head pain are transitory this measure is generally

indicated two or three times a week during the attack. Bromide in twenty grain doses, three times a day, constitutes the best internal remedy.

Meniere Disease.—In true Meniere's Disease or in the Meniere Syndrome with vertigo, deafness and vomiting, a diffuse headache is commonly present. The headache is, however, such a relatively slight ailment as compared with the other symptoms, that it is always in the background, except during the paroxysm of vomiting, when it is excruciating. Chloral in ten grain doses, every two hours, is useful.

Eustachian Tubal Closure.—Diminished patency of the Eustachian tubes often causes headache. When one tube is closed there is a diminution of the sense of hearing, and at first fullness is noted, which later may become pain. This is especially so when both tubes are closed. One can prove this phenomena, (1) by examination with watch as to hearing, (2) the beneficial results of inflation. The distinction between pain in the head and ears on the one hand, and the discomfort due to closure of the tubes, is not so easy to ascertain at the first attempt at questioning. It is well to precede the inflation by painting a solution of Agn (O_{32}) to the Eustachian orifice in the throat.

Treatment.—A dose of Calomel at night is a useful adjunct.

Adenoids.—The headache associated with Adenoids is a dull occipital pain; in children it is frequent,

and is often accompanied by earache. In fact any chronic headache with earache in a child should be regarded as being due to adenoids until proven otherwise. It is closely bound up with closure of the Eustachian tube. Removal of the cause cures it, and is a diagnostic therapeutic measure. A naso pharangeal headache often present in adult mouth breathers on awakening has a somewhat similar basic cause.

TREATMENT.—The treatment consists in either adenectomy, or of scraping a space in the posterior naso pharynx with the index finger; 2% sol. of Silver Nitrate locally, and a salve for use in the nose, containing one grain of Yellow Oxide of Mercury and ten grains of Argyrol to the ounce of Vaseline, night and morning are to be recommended for home treatment. Frequent small doses of Calomel are also indicated. Adenectomy is the operation of choice.

Pineal Gland.—Calcerous growths in the Pineal Gland rarely cause a dull headache. In the treatment of this form of headache, Iodine is a sovereign remedy. Arsenic and Mercury are helpful, but Iodide is by far the most generally useful.

Thrombosis of Superior Vena Cava and of Jugular Vein.—Thrombosis of the Superior Vena Cava causes a general headache. It occurs occasionally in heart disease; likewise Jugular Thrombosis causes headache, which is constant on one side.

Thrombosis of Longitudinal Sinus.—Primary Thrombosis of the longitudinal sinus carries with

it a severe headache and mental symptoms as well. The diagnosis is made from the attendant symptoms.

TREATMENT.—The treatment is surgical.

Cysticercus of the Brain.—Cysticercus of the brain produces a tumor headache and spasms of local groups of muscles, with epileptiform attacks. For a diagnosis however, it is necessary that cysticercus infection be present somewhere else in the body. Eosinophilia should call one's attention to this possibility.

TREATMENT.—The removal of the mother cyst in the abdomen is sometimes attended by cure.

Heart Disease.—The headache of chronic heart disease is a Mechanical headache. There is also a referred cardiac headache described under Reflex Headache. The headache of *acute* heart disease is a toxic headache. In chronic heart disease, with passive congestion in the body, there is a coincident passive hyperaemia in the brain. The presence of increase in venous pressure in the head that accompanies decompensation is not as noticeable to the eye there, as in other organs, because one cannot see post mortem the physical effects as they occur in life. However, the psychic changes and the headache are evidences of such a mechanical congestion. The writer would especially insist on the inter-relation existing between the psychic changes and the headache. This headache is for the most part a dull constant ache. It is only

paroxysmal during or after exercise. It is not present in the course of every cardiac decompensation. Doubtless the condition of the circulation in the nose is often a deciding factor, that is, if there are contacts made between the turbinates, which are also often congested, and the septum, the sinuses are cut off in this way and headache results. This would explain why cardiacs complain so bitterly of the paroxysms of headache associated with coughing. In congenital heart disease this headache is fairly constant. It is then usually accompanied by other signs of venous stasis, as dyspnoea and cyanosis. Such headaches are especially made worse by bending forward, and are often accompanied by visible throbbing pulsations in the veins of the forehead and neck. These sensations usually come on after severe exertion, and exertion always makes them worse. This is of some diagnostic significance. When any organ or part of the body exercises, there is more demand for blood, and if the heart cannot furnish it, the part makes known its want by pain. Oddly enough, a cardiac headache is rarely made worse by lying down, although most of the other symptoms are benefited. The reason of this rare occurrence is probably connected with the zones of Head. When a patient lies down his heart flattens out, and this takes up more room in the chest, so that the heart is enlarged and then the head may react.

Mitral Stenosis.—In Mitral Stenosis the headache may be perceived at the vertex. More often it is temporal or parietal. It is a throbbing headache, comes on upon awakening, or on suddenly rising out of bed. It is often worse on one side, usually in the left temporal region, and is often accompanied by tender spots on the scalp, (see Head zones); then again it may be so severe that the patient cannot eat. Cardiacs are prone to develop the "close room" headache, especially if there is any turbinate or septal deformity.

Aortic Regurgitation.—In Aortic Regurgitation, attacks of headache are the rule. It is commonly throbbing in character, and is accompanied by flushing of the face. (See Referred Headache.)

TREATMENT.—The headache of Heart Disease is best managed by absolute rest. A complete horizontal position is usually impossible, but a reclining posture is commonly sufficient to relieve it. In Heart Disease headache is a presenting symptom, and generally occurs either during the course of an acute Endocarditis, which, if the headache is constant and severe, is quite likely to be a septic Endocarditis, or after a prolonged exertion in the course of chronic Endocarditis. A hot foot bath or an ice cap to the head is sometimes useful. A handkerchief tied about the crown of the head relieves some of the throbbing. In severe and recurring cases blood letting, or a leech behind the mastoid, affords relief but in general the headache of Broken Com-

pensation is best managed by treatment devoted to the underlying cardiac condition. Meanwhile the acute presenting symptom must be relieved. Aspirin is a good remedy, and does not damage the heart, nor often produce unpleasant effects, unless there be a personal idiosyncrasy. Heart patients, because of their attendant heart disease, in general are no more susceptible to the evil effects of Aspirin than any other sick person. Most cardiacs find their headache temporarily relieved after cathartics, and always attention to the digestive tract affords some relief. Strychnia often makes these congestive headaches worse. Opium given for other purposes seems frequently to make these headaches worse, and produces a dull headache. Hare suggests the combination of Nitroglycerin with the Morphin to lessen this headache. We have often found the combination efficacious. This is particularly true if there is an associated Nephritis present. For the rapid heart headaches, quiet and tea are beneficial. For the very low tension headaches, Caffeine is the best remedy. Cannabis Indica is of service in ordinary heart headaches, but because of its unreliability is not to be generally advised. Diuretin is of service in the combination of heart and arteriosclerotic headaches.

High Blood Pressure and Rapid Heart Action Hypertension.—High blood pressure and rapid heart action is often accompanied by frontal or occipital headache. In patients suffering from

high blood pressure due to any cause, headache is experienced whenever the blood pressure is *suddenly* increased or markedly diminished. This is often noted after the ingestion of the nitrites, or on sudden bending over, or by the head being rapidly lowered as in a barbers chair. In these subjects the headaches are more or less continuous, with severe exacerbation, coming and going for years. Some of these patients describe the pain as maddening. These headaches do not follow any rule as to occurrence, i.e. they may occur in one portion of the head to-day, and a different region to-morrow.

In any of these Intracranial Hypertension cases the headache may be very severe; the patient feels as if his head was going to split open. As a consequence he is mentally dull. While the headache continues there are paroxysms of pain, during which time the patient gives one the impression that he is going to faint; his face becomes pale and covered with cold perspiration. He suffers from nausea and a feeble rapid pulse. Generally the headache is diffuse. The question of coincident renal involvement must always be kept in mind in such patients. Active purgation affords much relief.

In cases where Intracranial Pressure may be considered a cause of headache, anything that tends to gradually lower this pressure tends to alleviate the suffering. From an experimental standpoint it is quite easy to assert that the pressure of the spinal fluid can be reduced to a great degree by the use

of concentrated salt solutions. Urea and Hugson showed that an intravenous injection of 1 gm. NACl per kilo reduced the cerebro spinal pressure from 80 mm. to 34 mm. In man, according to this research, ⅙ gm. per kgm. should be employed in order that one may reduce the Cerebro Spinal pressure 50 mm.

Following along this line it has been shown that also the headache of intestinal stasis is relieved by the internal use of strong solutions of sodium chlorid, independent of its cathartic action. The nauseating action in a large measure prevents the successful employment of this measure. If the salt be given in the form of a salol coated tablet of 1 gm. each the nausea is less common. Hugson believes that these salt tablets are successful in all of the milder forms of headache. Relief is usually obtained in from thirty to forty-five minutes, if two or three tablets are given every five minutes until ten are taken. In severe headaches fifteen doses are necessary. This treatment is contra indicated in nephritics and in the aged. It is too much trouble to continue this treatment in the average patient, but where there is an idiosyncrasy to the coal tar derivatives it may be tried.

In tension headaches, as in internal hydrocephalus tumor, etc. it is worthy of trial, and good results have been reported.

The high tension headache is relieved, (1) by purgatives, (2) Salicylates, (3) by Bromid, (4) by Kalii Iodide, (5) Gelesenium, (6) by Phlebotomy.

Low Blood Pressure.—A common low tension headache met with in women at the menopause, begins at the back of the head and neck, extending forward to the forehead, sometimes this is only a sense of constriction.

In general, headache that is associated with low blood pressure is a dull headache, similar to that accompanying Neurasthenia or one of the toxemias. It is relieved by the same measures that are successful in the headache of Neurasthenia. Sometimes it is made worse by lying down, and it is not influenced by digestive rules or by seasonable changes.

TREATMENT.—It is usually relieved by Cannabis Indica, by alkalias, and by a saline. Tea or Coffee affords quick relief.

Arteriosclerosis.—In Arteriosclerosis a dull headache is often present. It is sometimes described by the patient as the feeling of a tight band, or of compression with pain. It is often present in the morning on awakening, also after exercise, and grows worse until after breakfast, when it passes off. It is frequently vertical, more commonly frontal, and is usually accompanied by vertigo and various paraesthesias. Sometimes it is throbbing, or it may begin as a periodic Migraine with nausea and vomiting, once a month or oftener, and resembles in many respects true Migraine, except that it does not begin in early life; there is no aura, nor a family history of Migraine. The onset of vomiting sometimes relieves such headaches. Occasionally it is

quite severe, especially after strenuous exertion, and sometimes it interferes with sleep. Again, it is described as though a sudden sharp needle was thrust into the side of the head, usually in the parietal region, and is sharply localized over an area about one inch in diameter. In such cases it may continue constantly severe for several days, and often only a hypodermic of morphine will give relief. It occurs more often at night, and it is made worse by worry or hurry. It has no positive diagnostic import, but many of these patients develop Hemiplegia on the opposite side of the body at a later period. Others complain of numbness in hands or feet on the opposite side. This and other coincident symptoms call for rest, as they are often precursors of a stroke. Of course no one should make such a positive statement of the liklihood of impending apoplexy to such a patient.

This headache may for a long period be the only noticeable symptom of cerebral arteriosclerosis. It is often associated with spells of vertigo or of staggering. Generally there is lessened capacity for mental work. The bad temper of old age is a frequent accompaniment.

Do these headaches serve as a precursor of strokes? It is the common belief among the laity that such is the case. This applies particularly to the attacks of sharp pain, very intense in character, and complained of over a small area over the parietal convolution. On the other hand occasionally

the pain preceding a stroke will be referred to the inner side of the foot on the opposite side, and scarcely any headache is experienced. In a patient with other neurotic manifestations this complaint is apt to be overlooked, or considered as just one more symptom of a neurasthenia. Oddly enough the onset of the Hemiplegia completely and permanently stops the headache.

The resemblance of this form of headache to that of neurasthenia is often very close. In any person over fifty it is well to regard the cause of an unexplained obstinate headache to be arteriosclerotic. Sometimes the study of the eye ground is helpful, as the eye ground is after all a mirror of the brain itself. The presence of an accompanying syndrome of Meniere's Disease, is often of help in arriving at a conclusion.

Treatment.—The treatment is that of arteriosclerotic conditions in general. The mental activities must be sharply limited, inasmuch as we are dealing with arteriosclerosis of a working organ. Cramps in the legs would ordinarily warn us that there was arteriosclerosis of the limbs, and that the limb could not do any extra work; likewise headaches warn us that in these patients the limit of mental activity is easily reached.

Physical exercise, not involving distress, such as walking, must not only be desired, but insisted upon. Alcohol and tobacco are to be stopped entirely; the same is true to a large degree of coffee and tea.

Light frequent meals, a necessary amount of protein, hot foot baths, occasionally an ice cap or cold cloth to the head; in others heat is better; a regular daily bowel movement, obtained either naturally or by a vegetable cathartic. Inasmuch as saline cathartics are depressing, both mentally and physically to these patients, they should seldom be employed for continuous use. When quick action is necessary they are invaluable. Five to ten grains of Aspirin is the remedy of choice for the acute attack, unless the patient is susceptible to coal tar derivatives.

At least nine hours sleep must be insisted on, and when such amount of sleep is not secured Sodium bromide should be given with a free hand, using at least twenty grains t.i.d. When combined with five grains of an Iodide this makes an ideal combination. This combination should be continued for a month at a time. It must be remembered that persons at that time of life are for the most part subject to arteriosclerotic changes in other portions of the head that may often cause vertigo. The presence of blood pressure and urine findings are also of help. The question of Nephritis looms large in the diagnosis, and must always be ruled out.

In severe cases, venesection affords relief for a considerable period. This applies more particularly to florid individuals. Occasionally if the headache resists all other medication, a spinal tap is successful.

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Trauma to Head in Arterio Sclerosis.—In patients already suffering from arterio sclerosis trauma to the head is very apt to be followed by severe and very obstinate headache. It is a diffuse headache spreading over the whole cranium. It is usually present soon after the injury, when it may not be a presenting symptom, but is much in evidence a few weeks or months later, when the primary symptoms have disappeared. The same is true of any head injury, whether arteriosclerosis is or is not present, and the resultant closure of vessels may not be apparent for years later. Such headaches are commonly associated with dizziness, hot flashes, etc. By dizziness is not meant vertigo in the ordinary acceptance of the term, but expresses the patients complaint of a sense of lightness in the head, emptiness, insecurity in standing and staggering. These symptoms, particularly, the headache, are worse on stooping or looking upward, and by the ingestion of alcohol or by the use of tobacco.

A headache very similar, and very difficult to diagnosticate from this may, for want of a better term, be designated as a compensation headache. An injury is received in some part of the body remote from the head, but during the litigation a headache is complained of. The objection to calling it a compensation headache is that it may be due to a real spinal concussion, or to physical factors in the brain occurring at the time of the accident, or to a neurasthenia due to some other cause. Such

headaches are not ordinarily severe, are general, and if the patient is pinned down, are a discomfort, or sense of pressure rather than of pain. Their relief after the litigation is settled is sometimes the only suggestion that they have no organic basis. These headaches are also usually accompanied by other head symptoms, as vertigo, etc.

The outlook is better in most traumatic headaches if the patient can return to work, whereas in other instances the headache is much worse just as soon as work of any kind, whether mental or physical, is attempted. If the headache is severe, and persists for a week or so, absolute rest for long periods of time, at least one to two months, gives the best results.

In treatment, rest is our chief reliance. This and Aspirin in five grain doses are usually efficacious. For continuous use five grains of Sodium Iodid and twenty grains Sodium Bromid, twice daily, affords a good routine medication. No matter how long the headache lasts the eventual outlook is usually good provided no serious organic changes have occurred.

Cough Headache.—The headache associated with severe paroxysms of coughing, is commonly frontal or vertical. Occasionally it is bitemporal. This is due to interference with the return of the blood from the head. It is particularly noticeable in the whooping cough of adults, and in any paroxysmal cough, such as occurs in Influenza. As a rule there are temporary blood pressure changes. The patient

often complains more bitterly of the headache than of the cough. He often holds his head with both hands, and the pain lasts for several minutes after the paroxysm. When bitemporal, it often corresponds to Head zones of visceral involvement, or when Unilateral to Sinus disease.

In cough headache, as well as in any other headache suspected of being nasal in origin, when nothing is visibly wrong with the nose, either as to septum or turbinates, an X-Ray picture will often show the septum and turbinates in contact, the contact being made at a point not visible from the front. The Headache is usually fronto-temporal in young adults, vertical in the aged, in which cases it is usually due to an accompanying Arteriosclerosis. It is frequently relieved by a tight band about the forehead. These patients are free from pain between the paroxysms of coughing, but the skin is often tender over the area complained of, for some time thereafter. The head pain persists for several minutes after coughing. In a cough Headache the nose and ears should always be examined in any event, whether any pathology therein is or is not complained of. In paroxysms of Asthma, frequently a frontal headache over both frontal sinuses is present during the attack.

Treatment.—Cough headache is relieved, (1) by holding the temples, (2) by a tight band about the head, (3) by measures designed to alleviate the cough, (4) by narcotics. Many cough headaches

are made worse by nasal obstruction. Often both the cough and headache are relieved by, (1) by alkaline nose sprays, (2) to be followed by cocaine and adrenalin spray, (3) by a spray of two grains of menthol to the ounce of liquid albolene, and by purgatives. Such headaches are usually made worse by beer. The addition of Chloral, gr. v to the dose of the codeine or Heroin, often produces a magical effect.

Hiccough.—The headache due to Hiccough is similar in every respect to the headache due to coughing, (as far as the patient himself is concerned). It is sometimes the most annoying part of the Hiccough phenomena.

TREATMENT.—Treatment must be directed to the Hiccough, which is always the presenting symptom.

Irritation of Buccal Mucus Membrane.—If in a normal person one tickles with a feather, or with the tongue, the cheek, lip, or hard palate, at first no disagreeable sensation occurs, but if kept up the part becomes excessively sensitive, much saliva is passed out, and in a few minutes headache results.

Tongue Sucking.—A similar odd mechanical headache occurs in patients who acquire the habit of tongue sucking, i.e. making contact repeatedly between the tongue and the roof of the mouth. It is usually an occipital headache.

TREATMENT.—Mental control of the cause stops the headache. Bromid often makes the control easier.

Anaemia.—The headache of Anaemia is a mechanical headache, although it does not at first sight appear as such. In the course of any of the severe anaemias, headache is nearly always a prominent symptom. This is particularly noticeable in the Anaemia following hemorrhage, where the connection of headache and Anaemia is quite evident.

A novel explanation of the cause of this form of headache is the following: Since the skull is a cavity of fixed dimensions, and cannot enlarge or contract, then if the brain as a result of the anaemia has less blood in it the ventricles will fill with cerebro spinal fluid and become distended, to make up for the blood that is not present in the brain. The skull being a closed cavity, and since a vacuum could not exist, the cerebro spinal fluid must make up for the loss of space consequent on the lessened blood supply of the brain. The ventricles in such a case become distended, and produce a distending effect on the pia-arachnoid. The theory has been advanced that this distention is primarily due to instability of the sympathetic, which produces either a loss of the absorbing power of the arachnoid, or of the secreting power of the pia. This instability may be due to many causes, but in the last analysis is responsible for many of the mechanical headaches. Certain facts seem to bear out this theory, but it is by no means settled. This distention in turn irritates the nerves of the pia-arachnoid, and thus cause headache. A seeming confirmation

of this theory is sometimes to be met with in Rhinorrhea. When there is a diminution of fluid running from the fistula, the headache increases. When the discharge diminishes the intra pia-arachnoid pressure is greater, due to distention, and thus the headache is greater; whereas when the discharge is free headache disappears. When a post mortem is done on such an anaemic brain, there is no pathology evident, but if the brain is hardened at first, as soon as removed, and then cut at a later period, the distention of the ventricles may be evident.

Such a physiological picture will best explain many other headaches. For instance, the relief of headache afforded by a bowel movement, which is too rapid and complete to be accounted for by elimination of toxaemic products, will thus be explained. If one visualizes the sudden return of blood to the brain, and the recession of the fluid in the ventricles, the relief is satisfactorily explained. The increase of fluid will not result necessarily in increased cerebro spinal pressure; it merely fills in the space made vacant by the abstraction of blood. It is not the pressure, but the stretching of the ventricles that is responsible for the headache.

The headache of Anaemia is most often noted at the back of the head, and in the sub-occipital region, shooting towards the front of the brain; rarely it is vertical. It is brought on or aggravated when the patient sits up. It is usually associated with buzzing in the ears and vertigo, and this is of

considerable diagnostic value when there is a question as to whether the headache is due to anaemia or to some other condition. Various other theories have been offered as to the cause of this headache, but it seems more likely that it is a mechanical headache, due to the increase of subarachnoid pressure, and not to the anaemia as a toxicosis.

Chlorosis.—Because the symptoms so commonly associated with anaemia closely imitate those that accompany neurasthenia, both are often confused in a diagnosis. Severe chlorosis, which has fortunately become an almost extinct disease in this country, is occasionally accompanied by a papillitis of the optic nerve, as well as by headache. This association might easily be mistaken for the syndrome of brain tumor, especially when the digestive and head symptoms are pronounced.

Secondary Anaemia.—In Secondary Anaemia a somewhat similar type of headache occurs, but unless the Anaemia is extreme it is commonly spoken of by the patient as a sense of weight, rather than a real headache. This Anaemia would appear to be a mechanical Anaemia rather than a toxic one. One might consider the possibility of a toxic cause in the primary Anaemias, but that would scarcely answer in a secondary Anaemia, as for instance the Headache following from the loss of blood. When the headache occurs in the Anaemia following acute infections, then headache is not a marked symptom.

Pernicious Anaemia.—In Pernicious Anaemia, the headache is usually a late symptom, although at the first examination of the patient it is occasionally much in the foreground. One often gets the clue to an anaemic headache by the marked paleness of the fundi oculi.

TREATMENT.—The treatment of the headache is bound up with the treatment of the anaemia itself. Iron is of inestimable service in the anaemic headaches of chlorosis, but far less so in all other anaemias. Fowlers solution of arsenic is convenient, useful and quite as good as the iron. In pernicious anaemia blood a transfusion frequently completely abolishes the headache for months at a time, but thus far there are no truly curative measures.

Leukaemic Headache.—The headache of Leukaemia is of the same general type as the Anaemia headache, and may easily be mistaken for it.

TREATMENT.—X-Ray has some value as a curative agent, but in general, the disease is hopeless as to cure.

Hunger Headache.—Closely related to this type of headache is the headache of hunger. Here again the mechanism is not quite clear. This headache is relieved by the ingestion of food, and this is of prime diagnostic import. It is usually a bi-temporal headache. Food, caffeine and rest all relieve this headache. This is said to be a common type of headache in children in England. In this country it is uncommon in childhood. When a child complains of headache at ten A.M. and

4 P.M. in the absence of any of the ordinary causes of headache, a diagnostic test should be made by furnishing food at that time. It is frequently present in those patients who get up early, and who go to church in the morning before partaking of breakfast. Again, this early morning headache is fairly common in those who for any reason do not get their breakfast at the usual time. Here again there is often a question as to whether this is a mechanical or a toxic headache.

Headache Due to Deficient Coagulation of the Blood.—A similar type of headache has been described as being associated with deficient coaguability of the blood. It is a high frontal headache, rather a dull ache than a pain, and is somewhat controlled by calcium lactate, in xv grain doses, three times a day. This is an uncommon type of headache, and is for the most part confined to "bleeders." There is always considerable question whether the headache of these bleeders is due, (1) to one of the ordinary causes of headache, (2) to anaemia, resulting from frank or occult hemorrhage, (3) to deficient coaguability of the blood. It is often a very violent headache. In women it is sometimes associated with the menstrual period, and may be unilateral. In any event, before considering it to be a special headache due to deficient coagulation of the blood, one should attempt to eliminate any other accepted cause of headache that may be present.

TREATMENT.—Calcium Lactate or any of the soluble salts of Calcium, in fifteen grain doses t.i.d. is usually sufficient to bring relief.

Headache of Oversleeping.—Some persons notice a headache when they sleep longer than the customary period. It is a dull frontal headache. It may also be considered as a hunger headache, due to the patient omitting to take breakfast at the accustomed time, and the consequent deferrence of a bowel movement, thus causing a toxic headache from one or other cause. It lasts until late in the afternoon. This is a not uncommon type of headache in chronic Nephritis.

TREATMENT.—The treatment consists in having a regular time for getting out of bed each day of the week. It is commonly met with on Sunday mornings, due to the changed hour of arising.

Aneurysm of Head Vessels.—Aneurysm of the arteries of the skull causes a headache that is unilateral, throbbing in character, and associated with vomiting, vertigo, stupor and choked disc. The hearing of the murmur of a pulsating vessel, through the stethoscope placed on the surface of the skull, is of diagnostic import. This is pathognomonic, provided the murmur was not heard previously. This headache is frequently noticeable on awakening out of a sound sleep. The great frequency of neurosthenic symptoms in these patients often warrants close questioning as to the exact nature of the head discomfort. The

diagnosis is seldom made during life and the disease is very rare.

Multiple Sclerosis.—In this country Multiple Sclerosis is relatively uncommon, and not many opportunities are afforded to see its beginning. In England, where the disease is more common, it not infrequently begins with symptoms similar to Encephalitis Lethargica, with severe headache and disturbances of vision. The headache is spoken of by the patient as seeming to be within the skull. By eye examinations the appearance of retrobulbar neuritis is noted. All such patients demand a complete neurological examination as to speech, reflexes, examination for tremor, Babinski, Oppenheim and Gordon, and Nystagmus. In fact in many of these patients, the differentiation from Encephalitis Lethargica is, in the absence of a good history, well nigh impossible. In arriving at a diagnosis of Encephalitis the presence of the evidences of recent Influenza such as the congestive signs of Influenza in the mouth is of considerable help, especially in the absence of an epidemic. Most people who have had Encephalitis will show such evidences, as follows: (1) Congestion of external conjunctival, (2) purple lips (3) red arch of palate, (4) papules on the uvula, (5) sago grain-like bodies on the soft palate, (6) hemorrhages in the mucus membrane, (7) redness of the nares, and lastly, in those with back teeth the presence of an enlarged and reddened Steno duct. The Influenza patients

always show one-half to one degree rise in rectal temperature, at some time during the day. After a few weeks the distinction between Encephalitis and Multiple Sclerosis will become plain and the diagnosis is easy to make. As to treatment of Multiple Sclerosis Acetphenetidin, gr. x from time to time may be useful. The Iodid still remains the classical remedy.

Hydrocephalus.—In the primary form of Hydrocephalus, headache is seldom noted. In the secondary forms, which are usually due either to infections, to tuberculosis in some form, to middle ear disease, or any tumor or meningeal affection causing pressure on the veins of Gallo, headache is usually present. When such a hydrocephalus is developed quickly the pain is quite severe. In addition there are other symptoms strongly suggestive of cerebral tumor, such as the attendant vomiting, optic neuritis, ataxia and vertigo. The symptoms of this disease have remissions from time to time that are more marked than those that occur in tumor. The ausculatory sign noted by placing the bell of a Bowles stethescope on the glabella, and percussing in radiating lines from the back to front, and noting the change from the normal, occasionally serves to make the diagnosis. In differentiating a basal tuberculous meningitis from a cerebro spinal form, this manoeuvre is often successful. Furthermore, the shape of the head in children is sometimes of help in arriving at a conclusion. Such children

generally have bulging foreheads, with pulsating frontanels. Spinal puncture, or even puncture of the lateral ventricle may occasionally bring about cure, as well as certainty in the diagnosis. In any event relief is afforded. In a doubtful case, if no relief is secured by puncture and drainage, the liklihood of tumor as being the cause of the headache is very strong.

Spinal Osteoarthritis.—Spinal Osteoarthritis in the upper cervical region often causes the holding of the head in a fixed position. Some of the headaches arising from spinal trouble begin in the spine, at the base of the head, extending to the front, and then locate in one eye, usually the right eye. In such cases where there are areas of the scalp with soreness to touch, corresponding to the areas of distribution of the cervical nerves, as distinguished from the nerves that supply the brain, then the cause is usually extra cerebral, and the spine may be suspected.

Avoidance of bending the neck offers some relief, or the wearing of a suitable neck brace is efficacious. Hibbs has designed a suitable operation.

Headache Due to the Unusual Use of Neck Muscles.—A rather uncommon form of headache in the consulting room, but fairly common in actual life, is due to the exercise, or unaccustomed use, of groups of head muscles. This is noted after some unusual occupation, which necessitates holding

the head in one position for a long time. This is especially so after long rides, etc. It is closely related to the headache following the excessive use of the eyes. (See Eye Headache.)

Cerebro Spinal Rhinorrhea.—In this condition any diminution in the flow of fluid from the nose is associated with intense frontal headache. This disappears when the flow returns. People who have had Cerebro Spinal Meningitis, particularly if it was sufficiently severe to cause nerve palsy, either in eye or ear, are almost always headachy, that is, slight pathology is sufficient to produce headache.

TREATMENT.—Frequent lumbar puncture offers relief.

Indurative Headache.—This is known popularly as a gouty or rheumatic headache, because it is frequently present in people who complain of similar pains in other parts of the body, and it behaves exactly like such Gouty pains. Its frequency is variously estimated by different authors. Edinger considers that two-fifths of all headaches are of this nodular variety, whereas Auerbach believes that they constitute from one-fifth to one-quarter of all headaches. In New York it is rare. It is a common headache in England and the northern countries of Europe, and along the new England coast. In some parts of this country it is extremely rare. In Norway and Sweden the literature of this form of headache is quite volum-

inous. In as much as a great many Englishmen formerly had gout, and both the indurative headache and the Gout are aggravated by the same causes, it came to be known in England as a Gouty headache. At present it is not believed to be directly related to Gout. It is due to involvement of the fibrous tissues surrounding the joints and faciae. It is a variable headache, in that some days it is present, and then it may be absent for several days. Weather changes, such as low barometer, cloudy days, cold rains, etc. generally aggravate it. It is made worse by movements of the muscles, and after exposure to cold or washing the head in cold water, or by sitting at an open window. It occurs most commonly in women at the menopause, and generally it is to be met with in middle-aged persons, who for the most part have thin anaemic looking skins. It is commonly borne for a number of years without complaint. Such patients are scarcely ever free from pain in some part of the body. In some cases it is worse when lying down, particularly at night. In the course of the disease, chills or chilly feelings are often complained of. The indurations may be felt in the muscles at their insertion, and they vary in size from the head of a pin to that of a bean. They resemble enlarged glands, but they are smaller and more rounded. In the occipitofrontalis muscle, and also along the insertion of muscles in the occipital region, they are flatter and larger in size than elsewhere.

Rarely, the nodules are as large as an almond. They must be distinguished from the small node-like bodies found in the same regions, particularly behind the mastoid, in severe case of true rheumatic fever. Such nodules usually occur with severe rheumatic fever in childhood, and are accompanied by rise in temperature. In all instances these nodules are significant of a severe endocarditis. These also occur in the tendons of the backs of the hands, etc., and while they may be painful, the age of the patient, i.e. usually youth, the evidence of a severe infection, and the endocarditis, serve to indicate that they are due to a rheumatic infection.

The toxaemias, such as head colds, as well as pus in the crypts of the tonsils are, presumably, responsible for the infection in a large number of these Indurative headaches. It is quite necessary that one should not confuse this type of headache with the Sinus headache.

In the examination, relaxation of the muscles may be secured by bending the head backward. In any headache the patient easily misleads one by complaining of a soreness of the muscles because of the bending movement, which might easily be mistaken for this indurative headache. Occasionally by sleeping high on pillows the headache is less in the morning.

A headache which in some respects is closely related to this, and yet which is due to another cause, is the following: The patient suffers from a

chronic, recurring headache; there are associated painful points, or rather, tender-to-the-touch points, located in the back of the head and neck, or upper back. At first sight one is apt to consider that these are a part of some general process, or that the patient wishes to impress one that he has pains all over his body. Careful checking up of these tender points will often show that they are very real entities. A favorite location is at either origin of the trapezius muscle or over the spinous process of the seventh cervical vertebrae at the lower angle of the scapula, in the mid scapular region. Occasionally these tender spots are located over the top of the shoulder and along the triceps. These are just the points that are likely present indurations, but in this instance the indurations are absent. It is believed that the cause of these tender points lies primarily in disturbances in the eye and its muscles (See Eye Headache). Such tenderness and pain follow excessive use of the eye, and the eye in these people is not normal; the continued attempt to place the head and eyes in a line to see satisfactorily calls for excessive use of these muscles, particularly the scaleni and recti, and for this reason they are sometimes called the accessory eye muscles.

These tender points closely resemble the indurative tender points present in indurative headache.

Treatment.—In any schema of treatment, removal of the focus of disease is, of course, the measure indicated. Unfortunately it is not always

easy to localize this focus any more than it is to locate the focus in the closely allied condition of Arthritis Deformans.

Because of the frequent nasal origin of cryptic infection it is good treatment to clean out the nose, and evacuate the tonsillar crypts, thus allowing free exit for the pus contained therein.

These indurative headaches are made worse by cold applications, and are relieved by hot applications. At the first visit, a hot poultice, or better, an electric pad, is an agreeable way of applying heat. Acetylacid Salicylicum grains 15, every four hours, should be given, and an active cathartic, preferably castor oil, is to be administered. The purgative to be repeated frequently. Alcohol internally aggravates the pain. An anti-gout diet is the best dietary. In those who react well to Iodids a short trial of Calcium Iodide, gr. ii. t.i.d. is often followed by complete relief for a considerable period.

The patient should be told that it will require from three to six weeks before marked improvement will take place; and that at first the treatment will be painful; the seance must be daily at first, and later from two to three times a week. The technique of the treatment, which has been perfected by the Swedish masseurs, and is thoroughly described in all leading books on massage, is as follows: The patient is seated, holding his chin with both hands, his elbows on the table; the operator begins by making downward strokes with the palms of the hands,

along the sides of the neck, and on the back of the head; next, the underlying muscles are individually pinched and kneaded for at least a half minute; this is done by a circular movement. The first manoeuvre is repeated, and then the procedure is repeated over the rest of the scalp, and finally, a general stroking is done over the whole head. The whole procedure requires from fifteen minutes to half an hour. A course of treatment requires about six weeks. Nearly always there is a temporary aggravation of the symptoms, but later, marked improvement is noted by the patient. After the second week of treatment vibration and violet ray treatment may be substituted at times for the massage.

After the earlier treatments there is often much intensification of the pain. As a rule patients object because they are made worse by the treatment in the early stages, so that they should be forwarned of this before beginning treatment.

After ten or a dozen treatments pain is relieved, and the patient is usually completely cured at the end of twenty treatments. When the severity is greater, from six to eight weeks, with daily treatments, are necessary. Relapses are quite common. When there is a co-existing neuresthenia or anemia, one should make a guarded prognosis. In fact this indurative headache is often combined with neuresthenia, or with other forms of headache, and must be sharply differentiated from such headaches.

The cause of this headache must be visualized as a real disease entity, and not as just a mere manifestation of rheumatism.

When massage does not afford relief, the use of injection of decinormal salt solution from eight to ten c.c. or of 2 or 3 minime of a 3% Phenol solution at the sites of induration is sometimes successful.

This type of headache is quite common at the menopause, and is usually associated with a bagful of other symptoms. It has been a virgin field for the osteopaths, who, by relieving the actual headache have been magnified as therapists. Because of the relief of one real symptom in the patient, who is always talking of her ills, extensive propaganda as to the value of osteopathy for all disease, is the result and not infrequently the hair dresser gets the credit. When these headaches recur in spite of treatment, change of climate may be very helpful.

NOSE HEADACHE MAY BE CLASSED AS MECHANICAL HEADACHES

Nose Headache.—Pressure of the middle turbinate against the septum is the commonest cause of nasal headache. When this pressure occurs as the result of spur or deflection, it is accompanied by a feeling of tightness in the nose, and by supra orbital headache. In such a nostril dust, coryza, dry atmosphere, close atmosphere, or a sinus with pus, will all induce this phenomena. A head cold in the course of a normal menstruation is particularly

apt to cause this pressure, with consequent headaches. Probably the commonest primary cause is a productive inflammation of the middle turbinate bone itself, with or without the production of polypi, which on occasion absorb moisture and swell up, thus blocking the opening of one or more of the sinuses. In passing it may be noted that the bones in the nose are the only bones in the body that continue to grow in adult life. They frequently reproduce large portions of themselves after partial removal. The same is true of the membranes covering them.

Such headaches may vary from side to side. Pain due to an enlarged turbinate has its origin in the intra nasal portion of the nasal nerve, which is a branch of the fifth. The pain is referred to the forehead and vertex.

When the headache is due to contact between the middle turbinate and the Septum, if the point of pressure is in the anterior third of the turbinate bone, pain is usually frontal in character. If the middle third makes the pressure the pain is vertical. If the posterior third makes the pressure the pain is usually in the region behind the ear. It is seldom that pressure is made in one location alone; usually two or three points of contact will be noted, and consequently pain is seldom localized.

At first this pain is relieved by spraying thoroughly over the exits of the sinuses with Cocaine, and later with an Adrenalin solution. Relief is not

so prompt after later treatment as it is on the first occasion. In general the winter headache of the city dweller is a nose headache, aggravated by insufficient ventilation, and by steam heat. Such headaches are almost immediately relieved on going out in the air, and are due to the above mentioned causes. They may be short, or even of momentary duration.

It is quite easy to visualize the effect produced in the brain by such pressure, especially its effects on the veins and lymphatics of the nose that connect directly with those of the brain, dura and longitudinal sinus. A stasis in the nose will induce a stasis to some degree in the deeper veins.

Headaches associated with weather changes, in the last analysis, are usually nose headaches. The same holds true with foul air headaches, the headache of closed rooms, etc.

Sinus Headache.—Somewhat different both as to severity and duration, but in the main similar as to cause, is the Sinus headache. Sinus headache is an acute or chronic affair. The typical acute Sinus headache is the frontal Sinus headache. It is invariably preceded by a head cold. The headache commences early in the morning, or after breakfast, and lasts until late in the afternoon, when relief is obtained. It repeats the following morning, and so on each day for five or six days, then it begins to wax less, lasting from one half hour to an hour less than on the preceding day. Usually the duration

of the attack is about ten days. The pain is commonly described as maddening, and is localized *on one side*, is accompanied by tenderness to pressure, and is aggravated by exercise or stooping.

By Sinus headache is here meant usually a frontal Sinus involvement, although often there is one or more other sinuses involved; in any event they are overshadowed by the frontal sinus. The history of a head cold, a unilateral pain of great severity, a small amount of temperature, one-half to one degree or more, (by rectum) a slight Leukocytosis, 10,000 to 12,000, and a head pain that presents variations, are a commonly sufficient basis on which to make the diagnosis. An inspection of the mouth and throat reveals the presence of the signs of a head cold, or Influenza. These have been enumerated elsewhere. Among the laity this type of headache is frequently termed neuralgia, because of its great severity, and because it comes and goes. When in doubt the so-called Ewings sign, i.e. tenderness over the floor of the frontal sinus on pressure, may always be elicited. If the finger be inserted under the supra orbital ridge on both sides, and pressed back to the tubercle, around which the pulley of the superior oblique is attached, then in frontal sinus involvement this point is exquisitely tender on one side. This sign was described many years ago by Dr. Ewing of St. Louis, and will be described later.

Not always does frontal sinus headache occur in school hours, and according to rule, because there

are occasional cases where it occurs at two or three different periods in the day, or is present day and night, etc. These variations depend on the anatomical variations of the sinus, and on the time that the infundibulum opens or closes. Many events may bring about this variation, for instance, the ingestion of beer or whisky in the presence of a sinus headache will often temporarily close an otherwise patent infundibulum by congestion of a turbinate. Likewise tobacco smoke will do the same. A similar condition happens in all of the sinuses.

Maxillary Sinus.—When the headache is due to Maxillary antrum disease, the pain is often mistaken for a neuralgia, because it is referred to the front of the face, as well as to the head. Various reasons are assigned for the frontal pain often present in Antral disease. Suffice it to say that in most cases of acute Antral disease, the frontal sinus is also involved. The pain in Maxillary sinus disease is either over the maxillary sinus, or under the Supercilliary ridge, or even over the mastoid, the pain being then perceived through the Vidian nerve. Not infrequently teeth are drawn, in the belief that the pain is due to dental pathology. At other times it comes in paroxysms, and then very closely resembles true Trigeminal neuralgia. The pain is however essentially different from that of true neuralgia. In true neuralgia the pain is always sharp, momentary, like a lightning stroke, with an appreciable painless interval, whereas in sinus

disease, while the attack is on, it persists for hours and the pain is steady and constant. In neuralgia, in addition to this peculiar headache, there are many odd and bizarre symptoms.

The important point in diagnosis to remember is that in sinus disease there has been an antecedent head cold, with a dull remitting pain.

For a proper understanding of these headaches, it is necessary to briefly review the course of the nerves in this region.

Meckels Ganglion.—The nasal (Meckels) ganglion occupies the upper part of the sphenomaxillary fossa just behind and above a line projected from the posterior tip of the middle turbinate bone. Here it is enclosed by the very thin bony walls of the sphenoid, by the ethmoid, by the maxillary sinuses, by the lateral wall of the nose, and by a thin membrane closing the Sphenopalatine foramen. It is therefore surrounded by the nose and paranasal cells. Its sensory roots come from the maxillary division of the fifth nerve. Its motor root is the great superficial petrosal, arising from the seventh nerve; this is joined by the great deep petrosal; the sympathetic root connects with the superior cervical sympathetic ganglion forming the Vidian nerve which enters the ganglion. These nerves also lie in very close relation to the paranasal cells, especially the sphenoid. The nasal ganglion sends branches to the sphenoidal and ethmoidal air cells, the periosteum of the orbit, the mucous membrane

of all parts of the nose, the roof of the mouth, the soft palate, the tonsils and the nasopharynx. Through its sympathetic root it is connected with the superior cervical sympathetic. Therefore it is situated near, or surrounded by the posterior ethmoidal cells, the sphenoid sinus and the antrum of Highmore. It will thus be seen that an inflammation of the nose or paranasal cells, or pus in either of these centers, may easily affect the nasal ganglion, its roots and branches, by direct extension or through absorption of toxins.

Ethmoid.—Inflammation of the frontal sinus is, in the majority of instances, associated with inflammation of the anterior Ethmoid cells. The headache is usually unilateral, and is situated over the inner corner of the orbit or over the eyebrow. Tenderness to pressure over this region is in the acute cases almost invariable. When the Ethmoid alone is principally at fault the use of the eye does not produce headache. When combined with the frontal this is painful. In general, Ethmoiditis also causes a vertical headache, occasionally frontal, but rarely occipital. Often it is described as though a wedge was driven into the base of the nose. When there is involvement of the anterior labyrinth of the Ethmoid, the tenderness is at the site of the lacrimal bone. These patients often complain of a feeling of sand in the eyes.

In many cases, simple treatment with an astringent, or the application of a weak solution of Silver

Nitrate to the upper and middle meatus, repeated three times a week, for three or four weeks, is sufficient to bring about cure. However, in the chronic cases sooner or later, the anterior portion of the middle turbinate bone must be removed. In Sphenoidal disease, combined with posterior Ethmoid disease, the pain is occipital, or it may be a pain that darts out to the ear.

Sphenoid.—The headache of Sphenoid disease is of two kinds, (1) due to obstruction of the flow of pus, causing a dull heavy pain at the back of the head, (2) pains referred along the nerves that pass over the region of the Sphenoid. Not infrequently there is a drawing or dragging sensation, extending from the occiput to the spine of the seventh cervical vertebra. There is a desire to angulate the head and place a hot water bag in the nape of the neck. The differentiation from neurasthenic headache is made by the presence of a slight temperature reaction, and by the other signs of an acute infection. After three or four days the free discharge of pus from the nostril solves the problem.

Injections of Cocain into the Sphenoidal cavity will frequently temporarily relieve this pain. After this treatment the application of a solution of two per cent silver nitrate to the middle meatus over the sinus is usually successful. In severe and chronic cases an operation consisting of removal of the obstruction is necesssary. Occasionally in a stubborn case, alcohol injections into the ganglion

are of service. In the majority of instances more than one sinus is simultaneously involved. Operation is not signally successful in relieving the discharge, but it often does cure the headache.

Inasmuch as inflammation in one sinus causes a headache that may be confusing because of pressure on surrounding nerve tracts, it is advisable to consider the pains of the various sinuses separately. The closure of the mouth of the frontal sinus may follow from any one of a number of causes, and at any one time two or more such causes may be active. In some people a very narrow nose that rapidly becomes congested because of a digestive upset, or by a head cold, will account for this closure. A deviated septum under normal circumstances may not cause trouble, but in the event that any congestion may be present sufficient to make contact with the turbinate, then it becomes an active provoker of pain. Any enlargement of the processes of the Ethmoid may also be the basic factor. Likewise excessive swelling of the cavernous tissue of the middle meatus from sexual excitement, menstruation, etc. may be sufficient to block the hiatus semilunaris.

While the attack is on, bending or stooping causes increased pain; lying down usually relieves it. To summarize; In maxillary sinusitis the pain is usually in the maxillary and occipital regions. Frontal sinus disease produces pain in the frontal region; Ethmoid or Sphenoid disease, supra orbital

or temporal pain. A sense of pain back of or deep in the ear, is often due to the Sphenoid, and apt to be mistaken for eye or ear disease. Weak eye muscle, plus the nose pathology, often causes a headache, and when one of these faulty conditions is relieved the headache often disappears. Also, there may be present a toxic headache from pus absorption from the sinus. The more pus that flows the less likely will there be a headache.

Diagnosis.—Headache due to frontal sinus disease may resemble that of Sphenoidal inflammation. In passing it may be mentioned that it is particularly acute sinus headaches that keep school hours, but on the other hand they do not invariably occur in the morning. Very rarely these attacks occur in the afternoon or evening, and sometimes the attack only lasts two or three days. It has been suggested that the reason of the frequency of the occurrence in the morning is that the drainage canals are in the uppermost portion of the cranial cells when the patient lies down, and prevents the egress of pus, whereas after some hours of the upright position free drainage occurs, and the pain disappears.

Importance of the Diagnosis of Frontal Sinus Involvement.—Sometimes one meets with a patient who in the course of a supposedly frontal sinus involvement, complains of a headache in other portions of the head, particularly the top of the head, which possibly may be due to other causes,

here the finding of a positive Ewing is of great service. Inasmuch as involvement of one sinus alone is a rarity, the finding of a positive Ewing is of great service in positively showing frontal involvement. The objector will say that it does not make much difference to the patient, as the treatment will approximately be the same, yet the mental satisfaction to the physician in making a correct minute diagnosis will afford one of the few pleasures that come to a practitioner of progressive ideals.

If a negative diagnosis must be made, it is possible to diagnosticate the absence of frontal sinusitis, when there is an absence of pus flowing from the frontal sinus, with an absence of tenderness on percussion over the sinus, and the absence of Ewings sign, supplemented by negative X-Ray findings. Sometimes sphenoidal disease simulates maxillary antrum disease, and here there is a negative transillumination, absence of pus from the cavities of the nose after shrinking with Adrenalin, and lastly, maxillary puncture is negative. Ethmoidal disease may be differentiated by the presence of pus coming from or in the Ethmoid cells. Sphenoidal headache is the only Sinus involvement that is likely to occur at night.

Anterior Ethmoid disease is referred to the frontal region, and to the space between the eyes. In the antral disease the pain is sometimes occipital, and there is apt to be also tenderness over the

canine fossa. In combined maxillary and sphenoid disease, the pain is usually in the occipital region, and in the whole anterior portion of the face. The reason of this wide distribution is due to the fact before stated, that Meckels ganglia, and the first and second branch of the fifth nerve, are so close to the wall of the sphenoid sinus that the pain is generally referred to the respective tracts of the first and second divisions of the fifth nerve.

In combined Ethmoid and Sphenoid disease, pain is referred to the occipital, deep temporal, and parietal portions of the affected side, sometimes to both sides.

The irregularity of the pain in Sinus headache, and the apparent good health of the patient in the interval, the ability to sleep and no evident cause of headache, are apt to lend color to the diagnosis of nervous headache. In passing it may be mentioned that some of these patients have lost the sense of smell, and this is often a clue. One must, here as elsewhere, keep in mind the fact that an added neurasthenia is nearly always present in any continually painful process, so that one must, as it were, shut one's eyes to the presence of the plus neurasthenia in trying to arrive at a diagnosis. The relief afforded by proper rhinological treatment is one of the most satisfactory accomplishments in medicine. In passing it may be stated that when no relief of the pain is noted after drainage, one is justified in suspecting malignant disease.

The chronic form is accompanied by a steady pain, which may last for a few hours each day, coming and going, and which rarely keeps the patient from sleeping. Ewings sign is generally present when the frontal sinus is affected. When the pain is all over the head, and when there is doubt as to which sinus is involved, the well known "Weber" test, as it is applied to the ear sometimes will be found to be of service in determining the side affected. It is a well established fact that when a vibrating tuning form is placed on the mid line of the skull, the vibrations are best noted on the diseased side. The same test is applicable in disease of the nasal sinuses, the vibrations and increase of pain being noted mostly on the affected side, even though there is no ear involvement. These chronic sinus cases are like the acute cases, always tender on percussion, and often to pressure. Slight percussion often localizes the pain. Any strong percussion aggravates it and makes it general in character. Every acute coryza makes it worse. Of very great diagnostic import is the fact that these chronic sinus headaches, like the acute involvements, do show a slight rise in temperature, from one-half to two degrees, at some portion of the day, provided the temperatures are taken every two hours by the rectum. They usually also show a leukocytosis of from nine to ten thousand.

Many of the chronic cases do not have any obvious nasal discharge. They do have a discharge

however, but frequently it descends behind the soft palate into the throat. It may often be noted that the posterior pharynx on the side of the sinus involvement is quite red from the discharges. The inhalation of irritating vapors, or confinement in a close room, will sometimes initiate the acute return attack.

In chronic cases there is usually the history of frequently recurring acute attacks with fairly comfortable intervals. It is in these chronic recurring sinus cases that most of the difficulty occurs in arriving at a diagnosis. Here the X-Ray picture is of signal service. It must not be forgotten that a negative picture does not exclude sinus disease, because the cavity may not be filled at that particular time, so that when all of the signs are present, with a negative X-Ray picture, a second picture should be taken.

The headache and pain of chronic frontal Sinusitis is less severe than in acute frontal Sinusitis.

There may or may not be any pus in the frontal sinus in such cases at the time of examination. These chronic sinus headaches resembles ordinary acute frontal sinusitis, in that the attack usually appears in the forenoon, and disappears in the afternoon, and is often made worse by the use of the eyes.

The cause of the eye reaction is the constant strain of the superior oblique, dragging on the pulley at its point of attachment at a point where the sinus wall is thinnest this tugging aggravates and

intensifies the dull ache, resulting from the closed sinus. Ordinarily the patient does not mind this dull ache, but the added drag of the eye muscles in reading is just sufficient to make it noticeable. Glasses do not materially relieve such a headache. Removal of the offending nasal tissue, if possible, is often sufficient for cure. The use of Adrenalin locally, is a valuable diagnostic measure, because by opening the mouth of the sinus, relief is almost always obtained. The continued maintenance of the patency of the infundibulum is generally surgical, and is described under treatment.

Treatment.—In beginning the treatment of all kinds of Acute Sinusitis, one should disabuse the patients mind of the hope that successful relief of the pain will be continuous, otherwise his confidence in the physician will be shaken; on the other hand one should prophesy a week of pain, during school hours, pain that is always relievable but nevertheless still present; that after the first three or four days the pain will last from a half to one hour shorter each day, so that at the end of a week the pain, while quite as severe as at the beginning, will not last more than half an hour. If this is not done the patient and his friends may, at the first return of the pain, grow restless and seek relief elsewhere.

The following measures should be employed at the first treatment in the office: (1) A Cocaine spray of one-half of 1%, to be followed by Adrenalin spray 1–10000, (care being taken to keep the

Adrenalin spray very mildly acid in reaction); after this a mild Iodine spray, such as the following:

Kalii Iodid
Iodine Crystals
Ac. Carbolic..... aa gr. i
Glycerin
Menth Pip..... q s ad ℥i
Sig.

Local use in an atomizer and this to be followed by a spray of

Menthol and Camphor..... aa gr. ii
Liquid Albolene..... ℥ i

The pain is nearly always relieved by the first treatment, and such relief produces a satisfactory confidential reaction on the part of the patient, impressing him that the physician understands the case. Next, the patient may be furnished with a mixture,

Camphor
Menthol..... aa gr. ii
Milk of Magnesia (Phillips)..... ℥i

a teaspoonful in a pint of boiling water, to be inhaled as an inhalation whenever pain becomes noticeable, (2) a solution of Adrenalin, 1–10000 to be used in a nose atomizer. After a few treatments by the patient himself this atomization usually fails to furnish relief. It should be used whenever the inhalation fails to relieve pain; sometimes Adrena-

lin inhalant may be satisfactory; (3) an active cathartic; (4) a sedative as follows:

Aspirin
Acetphenetidin..... aa gr. x
Codeine Sulph..... gr. ½

One such powder every three or four hours.

Bending forward as in lacing the shoes is often followed by free discharge and relief in sphenoid sinusitis.

Whenever possible the patient should come to the office for treatment at the commencement of the morning headache. As the case progresses of course, all of these measures may be gradually diminished. After there is a free discharge of pus if an air suction or Nicholson syringe is at hand this may be used to considerable advantage. The Nicholson syringe may be used by the patient at his own house. In the event of these measures failing to afford relief, an ice bag placed over the seat of pain affords considerable amelioration.

All of this technique may seem extravagant, but this pain is one of the most maddening in the whole realm of medicine, and every measure must be employed to relieve it. During the acute stage, unless there be a large polyp blocking the opening, no one but a neophyte will perform an operation. Meanwhile, the patient should avoid, (1) dusty places, (2) smoking, (3) wet feet, (4) alcohol, and must keep the bowels open and eat lightly.

Chronic Sinus Cases Treatment.—In those patients who have a small nose, not much is to be hoped for by extensive removal of tissue. One must, as far as possible, remove the major points of contact, but treatment should be directed, (1) to dietetics, in an attempt to lessen congestion by diminution of meat, abstinence from alcohol and from any other foods that cause nasal stuffiness (2) by local treatment by depleting with above treatment two or three times a week, and by making occasional linear cauterizations. Such cases must be treated over a long period of time, and are the despair of the rhinologist.

Where the nose is large, and there is marked enlargement of the turbinate, with a deflected septum touching the turbinate, or with polypi, of course only surgical removal of the obstruction and straightening of the septum is indicated. Occasionally linear cauterization of the turbinate is successful. All of the nasal operations requiring removal of the tissue may with a little practice be performed by the general practitioner. The patient should always be advised as to the liklihood of the return of the cause of the symptoms after a year or more.

Vacuum Headache.—Another type of Sinus headache has been described, in which there is an absence of pus or acute inflammation. The prevailing theory of the mechanism of many of these obscure dry sinus headaches is that of Sluder. He predicates that after the closure of the sinus by the

blocking from any cause, enclosed air is rapidly absorbed, thus producing a vacuum. The negative pressure is sufficient to cause a dull pain in the region of the sinus. This chronic sinus involvement is accompanied by a steady pain which may last for a few hours each day, coming and going, and which rarely keeps the patient from sleeping. There may be weeks and months between the attacks. The pain is not always complained of over the closed sinus.

In general the diagnosis of this vacuum headache is arrived at by, the presence of (1) A unilateral pain of much variability, (2) Absence of pus in its usual situations in Purulent Sinus disease, (3) Relief by Adrenalin and Cocaine, (4) By the presence of a positive Ewing sign.

TREATMENT.—The treatment consists in removal of the obstruction to the mouth of the sinus. It is usually the middle turbinate bone that is at fault.

Ventilation and drainage form the basis of treatment. Suction should be tried with five to ten pounds negative pressure. Not infrequently a chronic sinus represents an inherited luetic infection. Lues has a natural fondness for these structures, and in any case of chronic sinus disease, both the patient and his ancestors should be examined as to possible luetic infection. Closure due to external pressure on the supra orbital foramen is a rare cause of headache.

Cocanization with a four grain solution of cocain applied to the region covering Meckels ganglion,

i.e. to the area of the naso pharynx opposite the posterior tip of the middle turbinate bone, anaesthetizes Meckels ganglion, and generally gives temporary relief. It is a valuable corroborative measure, and is a very satisfying procedure.

As to the outlook in these cases, much can be predicted from the condition of the portion of the middle turbinate bone, that is removed for therapeutic purposes. If there are evidences of marked periosteal thickening in the removed middle turbinate, it is probable that the outlet will be closed again within from two to five years after the operation, so that the vacuum will probably recur. A similar temporary condition of blockage is likely to occur at any time in the course of a severe cold in the head. In such recurrences, however, it is seldom that the pain is so severe as it was in the first instance. If however there are no marked changes in the turbinate bone the cure is likely to be permanent.

Vidian Neuralgia.—Sluder describes an uncommon form of headache which he calls "Vidian Neuralgia." After a severe cold in the head producing a posterior Ethmoiditis and Sphenoiditis, the pain still sometimes remains. This pain begins at the root of the nose, or back of the eye or jaw, extending backward to the temporal region, and frequently it is referred to a point about one inch behind the mastoid. From that point it radiates around the occiput and down the neck. An unintelligent patient has great difficulty in describing this pain.

Inasmuch as the sympathetic portion of the Vidian sends branches to the spinal ganglia, as far as the first dorsal, and the first dorsal sympathetic sends fibres to the heart, Hay suggests that this may account for some of the attacks of Angina Pectoris, which occur in patients following the advent of a coryza. It seems to us more likely that the Coryza, or as it is more properly called, Influenza, causes the anginal attack, because of the general infection invading the cardiac tissues. Certainly Angina and other cardiac and vascular diseases follow in the wake of head colds more than after any other infection.

A rare type of headache that may be classed as either a toxaemic or a mechanical headache, presents the following complaint: The patient complains of a dull heavy ache over the whole head, coming and going for years, accompanied by attacks of chilliness, and edema of face and feet; sleep is heavy and is not restful; constipation is the rule. This puffy condition of the face and feet is transitory. It is relieved by Calcium Chlorid in twenty grain doses, t.i.d. It reappears on the use of Sodium Chlorid or Sodium Citrate in twenty grain doses, again disappearing on the administration of the Calcium salts. These phenomena are due to changes in the intracranial tension. It is in this country at least a very uncommon phenomena.

One might in this way class as mechanical headaches, the emotional headaches, the vascular disten-

tion following the use of Nitrite of Anyl, and various vasomotor changes.

All of the headaches associated with changes in the circulation of the cerebro spinal fluid, especially when the blood of the body is largely contained in the splanchnics vessels in the abdomen, are favorably affected by the wearing of an abominal belt.

General Principles of Treatment.—The treatment of Mechanical headache is in the last analysis the treatment of the underlying condition. Inasmuch as one must think along mechanical lines, it is largely surgical, but one must go a long way before surgical measures will be considered by most patients.

REFLEX HEADACHES

While they are the most common of the chronic headaches, they are more difficult in diagnosticating than any other form of headache. It is quite easy to make out the cause of a headache that is due to a severe toxaemia associated with temperature, or with some local head pathology, but to refer the headache to some diseased process in another portion of the body, far removed from the head, is a problem that calls for much judgment and responsibility.

Distribution of the Pain.—Among the reflex causes of headaches, in the order of their frequency, are (1) Eye strain and other disturbances of the ocular apparatus; (2) Organic disease of the heart and chest; (3) Organic and functional changes in the uterus and ovary; (4) Hemorrhoids; (5) Decayed teeth; (6) Functional disturbances of the gastro-intestinal tract, (7) Organic disturbances of the gastro-intestinal tract, such as chronic Appendicitis, gall bladder disease, etc. (8) Neurestheníia from any cause; (9) Organic and functional distress of the genito urinary apparatus.

Eye Headache. Reflex.—Any extraordinary stimulus applied to any of the organs of "special sense," will, in some people induce reflex headache. This is evidenced by the headache that results from

very strong light, loud sounds, or a disagreeable odor. It is the eyes, however, that are responsible for approximately 75% of chronic, bilateral frontal headaches, or for 40% of chronic headaches of any kind; so in any case of chronic headache without a manifest cause, the shortest cut to a diagnosis is usually by an examination of the eyes. Almost everyone suffers from mild headache after prolonged use of the eyes in reading, etc.; especially is this so if one reads with poor light.

It is to the credit of American physicians that the relation of eye strain to the production of headaches has been impressed on the world. True, the connection was pointed out by Donders and others, many years ago, but the connection was not impressed on the medical world until the advent of Weir Mitchell and his co-workers. The placing of the knowledge of the use of a well known fact in the hands of the general practitioner and oculist, is quite as important as the discovery of the fact itself, and in this instance the knowledge of the place of the eye in causing chronic headache must be classed with the discovery of anaesthesia and antisepsis, as one of the great advances of the last century.

Headache is occasionally the only symptom of defective vision, and there may be no pain nor ocular fatigue noticed.

In eye headache both the third nerve and the fifth nerve are involved; there is a parietal and frontal headache arising from irritation of the tentorial

branches of the fifth nerve, but the full pain is referred to the eye ball and behind, as if it came from the third nerve. At first it is confined to the eye, but if the strain is continued, it spreads to the root of the nerve.

Eye strain pains are usually bi-lateral. The order of the frequency of the headache is as follows: (1) Supra orbital, (2) deep orbital, (3) fronto occipital, and (4) temporal. Eye headaches generally occur after near work, but not always so. Sometimes they are noted after much use of the eye in distant vision. In these headaches the patient often states that after the use of the eyes the lines and letters run together, and become mixed and blurred. There is also redness of the conjunctivae; this causes the patient to complain of a burning of the lids. Oddly enough the majority of persons suffering from eye headaches have good distant vision; on the other hand near-sighted persons rarely suffer from eye headaches. This may at first seem paradoxical, but it is nevertheless quite true. Another paradox is the fact that occasionally in eye strain following much reading or near work of an evening, or of a busy week, the headache comes on when the eyes are opened on the following morning.

In the last analysis nearly all of the pain of eye strain is due to spasm of the ciliary muscle.

The cause of the occasional morning headache from eye strain is as follows: During sleep the mechanism of accommodation comes to rest, and

spasm is relieved. A sudden opening of the eye puts the strain on again. The suddenness of the contraction of the ciliary muscle is a greater factor than the amount of contraction when slow adaptation takes place.

Eye headaches vary in many ways in their mode of onset. Usually they commence with a feeling of heaviness. A dull *eye* pain occurs at first, to be followed by an intense headache, often with vertigo and nausea. When the headache involves the temporal region, whatsoever the cause may be, nausea is the usual accompaniment. In most cases the headache ceases with sleep; in a few it persists after sleep. In the last analysis the abnormalities of the shape of the globe of the eye are commonly inherited. The short eye of the hyperope, as well as the irregular curve of the astigmatic cornea, or a combination of the two, are responsible for most of the headaches due to eyestrain. Usually such a patient says that there is a blurring of the printed page at first and then eye tire.

In chronic cases there is often, in addition, a distinct reddening of the conjunctivae and repeated styes or chalazion. The character of the pain is usually dull, which may become boring if the eyes are continued at work; later it becomes general. It may be followed by nausea and vertigo, and thus it closely resembles Migraine.

The pain of a true Migraine is not curable by glasses, although if there be a defect in vision, and if

it be corrected by glasses the Migraine is often made bearable. Sometimes the type of headache under consideration is relieved only by living in a dark room for several days. In those who complain of the severest and most persistent headache small *errors* of refraction, with an otherwise normal vision, is the condition most fequently found at examination.

It must be emphasized that this is the finding to be expected, as most patients will insist that their eyes are all right, and that they have good distant vision.

From the Opthalmologist's standpoint the site, the character of the pain, the time of the day of its occurrence and greatest severity, the character and amount of employment of the eyes, and the general state of the health, are the points of inquiry. Most easily relieved eye headaches are frontal or orbital.

Occasionally one eye is unequal to the other eye from a refractive standpoint, and the constant strife between the eyes is responsible for the headache. Likewise one eye may be on a different plane from the other; this causes an unequal use of the eye.

Unless there is a stretching of the Choroid, ordinary Myopics do not have headache, but suffer eye tire. Progressive Myopia rarely produces pain on the top of the head, and tenderness of the orbits. Hypermetropic astigmatism generally is painful.

The typical eye headache is located in the supra orbital and frontal region, and occurs usually in

the afternoon or evening, or after the use of the eyes for near work. The pain passes off after a night's rest. In other instances, though not commonly, the pain is in the temporal or occipital regions. In their order of frequency cases demanding ocular attention fall into the following categories:

Refractive errors
Faults in Muscle
Defects of Intrinsic Muscle
Faults in extraordinary muscles of vision
Faults in the Lids
Faults as Glaucoma
Faults in Extrinsic inervation

Eye headaches are usually due to small errors of refraction, or to lack of muscle balance. Eye headaches may come on after the fifty year age, the older textbooks to the contrary. Some eye headaches are incurable because of anatomic defects in the skull or soft parts, or other abnormalities. Defects in accommodation are sometimes associated with parietal headache that for periods exhibits great severity, but any reflex headache is apt to have this characteristic. In some instances, when the retina is highly sensitive to light, retinal hyperesthesia is the cause of the pain. These retinal headaches are usually brow headaches, yet frequently the pain radiates to the back of the head.

Conditions of work causing narrow pupil, and occupations wherein the ciliary muscle is over active,

are frequent causes of headache in those with weak intrinsic eye muscles. Atropin Sulph one drop of a 2% solution in the eye, t.i.d. for a few days, usually relieves such cases, and suffices for a diagnosis. It must always be remembered that the eye will be incapacitated for twenty-four hours or more after the last instillation.

These ciliary headaches are mostly frontal headaches, and are made worse by bright lights. A myotic, such as Pilocarpin, aggravates the brow headache in these patients. Occasionally the continued internal use of Atropine relieves such eye headaches.

Another eye headache presents the following history:

A patient who has been rather reduced in health, or is recovering from a long standing disease or a major surgical operation, gradually begins to have symptoms of eye strain as a result of slight errors in refraction. When he is in good health the effort necessary to overcome the long pre-existing error of refraction or extrinsic muscle imbalance may give rise to no distress or reflex headache, but when the muscular contractions of the ciliary muscles as well as the extrinsic muscles are weakened through constitutional disturbances or tire, the same use of the eyes, which in health produce no symptoms, are then accompanied by reflex headaches that are pathognomonic of eye strain. An examination in such cases should be made under a cycloplegic,

and if any error of refraction or muscle imbalance is found, relief is usually accomplished when these are corrected. A more expensive method of accomplishing the same thing is to prohibit reading, and to send the patient on a prolonged vacation.

Next to errors of refraction, errors in muscular imbalance are the most common cause of eye headache. Imbalance of the vertical extrinsic muscles causes more decided headache than imbalance of the other eye muscles. An error as low as one prism diopter of vertical imbalance is sufficient to cause headache, whereas a lateral imbalance up to six prism diopters may not cause the same symptoms. In those cases vertigo and nausea, etc. are quite commonly present. Over-use of the internal rectii, occurs in the near sighted, and this may account for the occasional eye tire in myopes; a similar condition also is often present in exophthalmic goitre.

In general, frontal or supra orbital headache indicates a hyperopia as the cause, occipital headache means an imbalance of the extrinsic ocular muscles, and temporal headache is usually associated with astigmatism. When the headache involves more than one locality, a combination of refractive errors is likely.

After much use of the eyes, severe pain at the base of the skull is occasionally complained of in hyperopics, with exophoria or esophoria. This form of head pain is known as panorama, or railroad headache, because it follows a night at the movies, train

rides, visiting picture galleries, or shopping. It is more common in neurestheniics than in others. It is commonly relieved by a cup of strong tea.

Similar disturbances, due to the constant use of any group of muscles occurs whenever there is a disproportion between any two bilateral organs, such as those of the ear or of the eye. This sort of headache happens when from occupation or otherwise the neck is continually strained. A like pain in the head is noticed when the head is habitually craned forward or sidewise in an attempt to hear, or because of neck strain from an attempt to see or reach over an obstruction. A real occupation neuroses may also happen in such a muscle group, causing the sensation of pressure or of headache. A similar pain sometimes occurs in the nape of the neck, when there is a constant endeavor to keep the head straight or upright. In department stores and factories, dressmaking establishments, etc. this form of headache is not uncommon. Often the changing of the clerk from one department to another where the service is different, results auspiciously.

Rarely one finds a patient with headache, mostly suboccipital, that is associated with tender points in the upper portion of the neck. These tender points really correspond to the attachment of important muscles and tendons. These muscles are known as the accessory eye muscles; they are the recti and the scaleni. They are concerned in

the balancing of the head and neck. The adjustment of the eyes influences the pose of the head to a very decided degree, and the plane of the orbit is also a factor. Now, if the eyes for any reason of faulty accommodation, change the pose of the head to right or left, or up or down, in an attempt to see better, it is quite easy to understand that the muscles that accomplish this will be under a strain. If the head is habitually raised in an effort to bring the eyes in a physiological line, the splenius capitus is under a strain. Any muscle that is overstrained will develop changes that eventually result in pain.

Examination Headache.—The eye tire headache is often made worse by bright sunlight. Temporary relief is commonly obtained by the use of Atropin, and this is of some diagnostic value, but it renders the eye useless for several days. This headache is often temporarily present in students about examination time, and may well be due to overstrain of the muscles of the eye. Such headaches are temporarily relieved by large doses of Strychnine.

It must be remembered that patients who suffer for a long time from a localized headache from any cause, whether it be eye strain or other cause, will be very apt to have pain in the same region of the head at another time, when suffering from a toxaemia of an entirely different kind.

Often in adults a congenital defect of the eye or its muscles exists for a long time without symptoms, when the presence of an acute cold or other infec-

tion, as Measles, induces a sudden breakdown; then the patient has his headache, and never finds relief from it unless he wears glasses.

It is uncommon that the true eye headache is a vertex headache. In children with uncomplicated eye strain due to errors in refraction, brow headache is the rule. If there is also imbalance of the muscles, such as weakness of the internus, there is also, often, occipital pain.

Unilateral, supraorbital headache, or any form of one sided pain is not often due to eye strain. Those headaches due to the eye are bilateral.

In eye headache one should ask the patient to point with two hands to the painful point. He will then usually place the tips of the fingers over the mid-orbital region, and say that the skin is sore to touch. This superficial tenderness generally accompanies hypermetropia. If one eye is at fault, as is usually the case, the tenderness will be more severe over the eye that is at fault.

Eyelid Headache.—When nothing is noted in the eye as a cause of headache, not infrequently by raising the lids and carefully examining the conjunctiva of the upper lid far back, one notices loss of lustre or decided disease. Often one's attention is called to the lids because of a small yellow scab in the inner canthus. It is a sign of a long standing catarrhal conjunctivitis of the dry or roughened type. There may be little or no secretion in the conjunctial sac. The characteristic of

this pain is that it seems to begin in the back of the eye, and is reflected to the occiput. In this group of patients there is often the added complaint of drowsiness in the afternoon, so that in any eye examination the conjunctivae should be thoroughly explored.

Treatment for Reflex Eye Headache.—In cases wherein the eye is the cause of the trouble, suitable glasses often effect a prompt cure; while waiting for this correction, relief may generally be afforded by (1) disuse of the eyes, (2) by the use of Acetphenetidin or Aspirin and Caffein. When the cause of the eye weakness is only a temporary one, such as occurs when the eye is strained, as during examinations, large doses of Strychnia, gr. $\frac{1}{20}$, t.i.d. are sometimes successful. As to the glasses—the correction must be made as accurate as possible and the appropriate correction should be worn. A careful examination must be made for astigmatism and hypermetropia, as well as for muscle balance.

The average eye headache is relieved by a spherical plus fifty, in combination with cylinder plus fifty or plus seventy-five, axis ninety; in other words by a glass that relieves compound astigmatism of *low* degree. Just because the patient is wearing glasses when he consults the practitioner is of itself no reason for neglecting to make an ocular examination, as the glasses may be faulty or may have been correct a few months ago, but not so at the present

time. In the examination of anyone for eye strain as a cause for headache, a cycloplegic should be instilled previous to examination, and when the patient says that a manifest eye headache was not relieved by glasses, he should be questioned as to whether or not a cycloplegic had been instilled at the time of examination. Before putting Atropin or other cycloplegic into the eyes they should be palpated for the presence of excessive tension in the globes.

Especially in those under fifty years of age in all cases a cycloplegic should be employed when headaches are present. At the outset it must be explained to the patient who is suffering from chronic headache, that this is not the age of miracles, and that no *single* examination or treatment is likely to make a new man of him, even though such statements are made in novels, and by boasting patients; on the other hand, that much time and patience are necessary for lasting results. When this is explained to him by the physician, he is not discouraged when he is requested by the oculist or aurist to come for examination and re-examination, not once but often several times. Most patients have been brought up to the idea that a single fee and a single examination constitute the total of an eye examination. This may sometimes be true in the fitting of glasses for an ordinary presbyopia, but in the careful study of an eye for mixed astigmatism or improper muscle balance, a

single examination is farcial. Indeed, several pair of glasses may be necessary, before a permanent fitting is obtained.

It is appropriate to cite the personal experience of one of the best known neurologists in this country. He had been under the care and observation of several of the best known ophthamologists of this country for an intractable headache of ocular origin, with no relief; by chance he was carefully and sedulously examined by an ordinary and unknown oculist, who fitted his glasses and relieved his life-long complaint. A cure of this headache is the highest triumph of an oculist; far more so than the doing of a cataract operation, but it is difficult to impress the profession or the laity of the truth of this statement.

A large number of the patients who consult one for chronic headache are already wearing glasses. Questioning often reveals the fact that the glasses did relieve the headache for three or four months, but after that, the headaches began to recur, and the patient became discouraged. To overcome this failure, the oculist, after every such examination, should either send a "follow up card," or have the patient definitely understand that he must return in from three to six months, on a specified day, as slight change of lenses will likely be necessary. Again, many patients suffering from chronic headache, when questioned, will say that the eyes have been examined and no relief obtained. This is no

reason for dismissing the eye as a reflex cause of the headache, unless one is quite certain that the refraction was done in a careful manner and by a good oculist.

When in doubt as to the possibility of the eye as being the cause for the headache, after the installation of a cycloplegic, and correct fitting of glasses, a trial of several weeks should always be insisted on. Most people at first, dislike the appearance and bother of glasses, and the wish is father to the thought that the eye is not the cause of the headache. When in default of such a knowledge one should again refer the patient to a careful oculist. Unless the whole matter is completely explained to the patient, there are few who will literally follow this advice. Not infrequently a nasal obstruction is present as well as eye strain. In such a case one may be in doubt as to which is the cause of the headache; one should correct the eye strain with glasses, and wait a month or so, (unless there be some great urgency) and then treat the nose, if no relief has been afforded by glasses. It is not good practice to do an operation on the nose when perhaps glasses alone may afford relief.

It should be insisted that the glasses be worn for several weeks before discontinuing them. In some patients only a partial correction is tolerated. Incidentally some people are just as well served, and feel more comfortable if glasses are worn that do not entirely correct all of the error of refraction.

The use of glasses does not always change the picture, but if eye strain is present then after a week or so improvement should be noted. The first step is to afford the eyes a few days rest. Often there is present in the patient suffering from headache due to eyestrain an additional pathology in the shape of a run-down condition of health, so that in the management of such cases several weeks in the country, where there is much greenery and little strong sunlight, is of inestimable value; tonics are usually indicated, and the practitioner should not neglect this as soon as the glasses are prescribed.

It is not advisable to prescribe bi-focal lenses for these patients, at least not until one is quite certain that the glasses will agree with the patient. The vertigo that generally is associated with the beginning of the wearing of bi-focals, often causes the patient to feel that the cure is worse than the disease. It must be impressed on his mind that all new glasses are prone to do this. This vertigo is the cause of a large number of failures in eye work.

Photophobia is often apparently responsible for headache, but the ultimate cause is inside of the eye. Such people usually have crow feet above and to the outer side of the eyes. Treatment by proper lighting of their work room, by change of posture and exercises, slowly afford relief. Unfortunately employers are slow to grasp such problems, or the employee is too timid to discuss the matter, fearing that he or she may lose their position, or be accused

of trying to get a better job, etc. When such a patient is fully convinced that the position, draft, or what not, is the cause of the headache, it will require strong evidence to dislodge it from the mind, or to change the opinion, whereas the change of posture sought for will often have a salutary effect, and cure the headache.

One must always bear in mind that some eye headaches are really compound headaches. The eye is at fault and the vision must be corrected, yet other causes, either general or local, serve to keep up the trouble. In theatres, movies, etc. some persons have the headache if their seats are situated in orchestra or below the stage, and not if they are seated elsewhere. The throwing of the gaze up above the horizontal, without lifting the head, is responsible for a fair percentage of such so-called "movie" headaches. It is seldom that such people have headaches when they are seated in the balcony. Cyclists and miners, by constant use of the elevators of the eye are very prone to have such a headache.

Eye headaches from sun glare are relieved by dark glasses, but occasionally amber glasses are preferred.

Brilliant lights and vivid colors will often induce violent headache, which is at first frontal, and then becomes diffuse, and is often entirely relieved by the wearing of Crooks B lens. Grade A Crooks lens is used to relieve a similar condition, induced by less vivid color and lighting. In factories and offices such a colored glass is sometimes successful

in relieving discomfort. One must always beware of the patient who is promptly cured by the glasses prescribed, yet who afterwards gets another kind of headache. One should not promise too much by glasses nor be too ready to accept the miraculous cure.

Cases that are seemingly eye cases whose headaches are not benefited by glasses. In these patients there is a normal vision, normal refraction, no muscle irritation, possible slight cupping of the discs, yet the use of the eye seems to be responsible for the headache. Most of these patients have other disturbances of the autonomic nervous system, such as indigestion, exhaustion, etc.

There is another group of patients who wander from one oculist to another, receiving slight changes in their glasses, and each time enjoying some temporary relief from their headaches. Each oculist may make some slight change in the reading correction due to the altered general physical condition of the patient, feeling that often a very slight error of astigmatism is sometimes responsible for the headache; yet in most patients of this particular type the relief is due to suggestion.

In the headache of eye strain, etc. when the headache is due to simple overstrain, bromides are also often effectual. When the headache is due to sun glare a strong cup of tea, the use of yellow lenses, or remaining in a darkened room are useful measures of relief.

It is mostly errors of refraction of slight degree that are responsible for these headaches. These errors are often hereditary. Presbyopia is often a complicating symptom. The continuance of the faulty accommodation may, finally, set up permanent changes in the fundus, and in such instances the relief of the primary cause will not cure the patient. It must be pointed out that while eye strain may be relieved by glasses occasionally, the headache is not necessarily relieved. On the other hand, all patients with eye strain and its sequela, do not suffer from headache. There must be an added fault in the nervous system that elicits pain in the head, because of some abnormality in a special organ in one individual and not in another. Experience teaches that these patients who have headaches from eye strain, or from any reflex disturbance, are apt to have sensitive nervous systems in general, and are prone to other abnormalities, so that it is not wise to prophesy that there will be complete relief immediately following the fitting of glasses. Some of these people have been so long accustomed to headache that they think it is always with them, and if suddenly asked whether they have a headache or not will invariably answer "Yes," although on revolving the question in the mind, the headache may not be present at the time. By some observers this has been termed "Habit" headache. In managing such a patient from an oculists standpoint it is advisable to instruct him to call the oculist on

the phone after he has worn his glasses for one week, and definitely inform the oculist of improvement or not; usually this is a favorable report, and then he should be instructed to do this again in a week or two, and so on for two or three further weeks. This serves to orient the doctor as to the success or failure of his work, and to keep the suggestion that he has been cured regularly before the patient's mind.

The cases of eye headache of comparatively short duration are the easiest to cure by glasses. After the headache has lasted for years recovery is not so prompt.

Eyelid Headache.—The treatment of headache due to inflamed lids, calls for the application of 1% solution $Agno_3$, preceded by instillation of Cocaine solution 4% on alternate days, until the inflammation subsides. Attention should be given to any underlying dietetic cause. If it is very severe and immedate relief is necessary, then 10 grains of Acetphenetidin, (Phenacetin), is indicated.

Panorama headache is temporarily relieved by darkened room, a strong cup of tea, and the first formula. In other instances Bromides are efficacious. If this be frequent and continuous, an error of refraction, or muscle imbalance, is nearly always present, and an oculist should be consulted for advice.

Glaucoma.—Headache is usually the first symptom of a beginning Glaucoma. It radiates along the

course of the fifth nerve, and resembles a true trigeminal neuralgia of the first and second branches; it is very severe, and is due to increase of intraocular pressure. This pain, frequently beginning in the temporal region, spreads to the frontal region. It is sometimes so general that the patient does not at the first examination refer it to the eyes. It is frequently a *morning* headache. There may or may not be any signs of acute ocular inflammation.

Many good oculists have been misled by this type of headache, because there may be no other external evidence of Glaucoma, but the eye grounds will always give the clue. During a well-marked major attack, the pupil of the affected eye is dilated, and the whole eye is red and congested and filled with tears. Pain in this temporal region from any cause is always prone to be associated with nausea and vomiting and it seems likely that the vomiting of Glaucoma is somehow related to this association of temporal pain. While the pain becomes more severe the vision diminishes, the anterior chamber becomes shallow, and the cornea takes on a steaminess and the pupil assumes a greenish color; the eye itself becomes hard and stony to touch; the pupil is dilated, very often irregularly, and reacts poorly to light; at first there is some abnormality of vision, and colored rays or halos seem to surround the house lights; the disk has the appearance of cupping, and scintillations are sometimes present, as in true

migraine. Dilated and irregular pupil is the most valuable single sign noted by inspection. In such a well marked case even a tyro would not be mistaken, but it is often a year or so with history of attacks simulating Migraine before such a typical attack occurs.

Of course the attack usually occurs in those over fifty years of age, but one constantly meets with some young men under forty, whose severe migraine-like headaches are not suspected as being due to Glaucoma until irreparable damage has been done.

Delay in medical treatment is a grevious error, because, unless measures are instituted early, loss of vision and blindness is the usual result. Much professional discredit arises from such errors. In all cases of unilateral headache in the frontal region, following the course of the fifth nerve, in patients over forty years of age, an examination of the interior of the eye is absolutely necessary. The headache of Glaucoma may often be differentiated from Neurasthenia because Aspirin relieves the pain of Glaucoma, and the pain is constant, whereas in Neurasthenia the attention may be readily diverted and bromides are more efficacious.

Treatment of the Headache of Glaucoma.—The headache of Glaucoma may be relieved by the installation of a 2% Pilocarpin solution in the eyes. Often here, when the pain is severe, the prescription of Acetphenetidin and Aspirin, with or without

Codeine gr. ⅓, is a useful one. Pilocarpin or Eserin instilled into the eye are however most efficacious. At times Eserin instillation is irritating, and often itself produces headache. One should use Pilocarpin in 1 or 2% solution when one is in doubt as to the certainty of the presence of Glaucoma. In these cases the daily internal use of Calomel, gr. ⅒ t.i.d., for a month at a time, with periods of intermittence, is of inestimable value. When the pain is very severe, a hypo of morphin is necessary. The surgical relief by means of an iridectomy, or other surgical procedure, is within the field of the oculist, and he should be called in as soon as possible after a diagnosis is made. Of course an active saline cathartic should also be given soon after the onset.

Iritis.—In Iritis the pain is usually fronto temporal, or infra orbital; occasionally maxillary. There is often tenderness over the same areas.

Treatment.—The headache of Iritis is alleviated at times by leeches to the temple, and an instillation of one or two drops of a 1% Atropin solution three times daily. Here again, the coal tar derivatives, with or without Codeine, are useful for temporary relief, also Calomel is to be given in divided portions. Hot applications to the eyes give marked relief. A bowl of hot boric acid solution, containing gauze pads should be placed alongside the patient's bed, and these pads are to be applied to the eye every few minutes, either by the patient or by a nurse. The

cause should be ascertained as soon as possible, and appropriate treatment directed to remedy it when it is found.

Other Eye Conditions Causing Headache.—Obscure paroxysmal headaches, in which no definite cause can be assigned, are frequently relieved by Allonal. At times Aspirin may do quite as well.

In Retro Bulbar Neuritis, if pain exists, it occurs in the top of the head, between the forehead and vertex, and is best relieved by Morphine.

In any inflammation or swelling of the Choroid or tissues in the back of the eye, if pain exists it is referred to the back of the head, and reflected down the neck.

Retinal Detachment.—Detachment of the retina is sometimes associated with tenderness and pain over the vertex, i.e. on the top of the head on a line from ear to ear.

Pain in the ocular portion of the conjunctiva, and in the anterior layer is localized; likewise orbital growths produce local pain only.

Lacrymal Duct.—Inflammed lacrymal duct sometimes causes a referred mid orbital headache, and tenderness.

In a general way, the more anterior the lesion exists in the eye the more anteriorly on the surface of the skull is the referred pain when present, and the further back in the eye the lesion the more the pain approaches the vertical or occipital regions.

Headache Due to Referred Abdominal and Chest Disease.—For ages it had been noted that patients suffering from visceral disease complained of headache, but there was no very definite schema of connecting the presence of pain in various portions of the head with the visceral lesion in the abdomen and thorax, until Henry Head published his epoch-making researches. In the main his findings are still as classical as ever, and we shall quote largely from his findings, because we have verified them on many occasions. At times Head's formulae are not literally true, because the anatomical basis back of them does not repeat; in other words the anatomical arrangement of nerves, vessels and muscles are not the same in all individuals, and for that reason there is no "Yes" and "Always" in medicine. An anomalous distribution of nerves will account for many bizarre and unusual pains that are not to be explained on any other basis.

The theory which one would like to construct, that segmental zones on the thorax were supplied by one branch of a nerve figure, the other part of which would correspond with its cranial segment, is thus far scientifically unproven, but that a relationship exists there can be no doubt. Nor can one by this relationship, which is commonly present, directly determine what disease is present in the chest or abdomen that causes the particular headache. The only fact that can be ascertained

is that the diseased organ lies in the region of the body represented by the cutaneous nerve distribution supplied by that particular segment. Seldom is a single segment on the body involved, and likewise is it seldom that a single segment of the scalp is alone involved; usually there is considerable overlapping.

Observations made by Head, and since confirmed by others, are to the effect that the involvement of the cutaneous distribution of the third cervical is accompanied by a pain that shoots through the head to the centre of the forehead. A similar condition prevails in disturbances of the region of the fourth cervical nerve. There is no well defined area of referred pain until we come to the segment supplied by the second and third dorsal. Pain in this area sometimes produces a painful and sensitive area in the so-called mid-orbital region.

This mid-orbital region really consists of two portions separated from one another. The upper portion begins at the hairy scalp, just above the middle of the eyebrow, and is about one inch wide at its widest part, and extends down from one to two inches. Then comes an area whose exact relationship has not been determined, and then the second portion of the mid-orbital zone. It is one inch high, and one and one-half inch wide. It is situated just at the centre of the eye brow, and involves the greater part of the upper lid, and the inner half of the lower lid. The maximal point of

tenderness is in the middle of the supraorbital region, or just above it.

This mid-orbital region, corresponding to the region of the second dorsal segment, is often sensitive in aortic disease. It is frequently painful in Goitre. This mid-orbital region is generally tender and painful in eye disease, and at times one may be in doubt as to whether the headache is due to referred pain from disease of the aorta, or because of the eye disease. If Atropin is dropped into the eye relief will be afforded if the iris is at fault, whereas rest in bed will be of decided service in the aortic disease, and when the patient gets up it is apt to reappear. When this mid-orbital region is painful, due to aortic disease, it is very apt to grow worse by much reading or by excessive use of the eyes, and this is likely to be confusing, especially if hypermetropia is also present. One must remember that the eye muscles are like any other muscles of the body, and that their excessive use is followed by the same sort of distress that occurs in a cardiac following the excessive use of any muscle. In a cardiac this mid-orbital region area changes from time to time, and produces many unexplainable paradoxes.

The fourth dorsal nerve area correspond to the fronto nasal region. It is quite impossible to differentiate these upper dorsal areas one from another. Incidentally it may be mentioned that undue sensitiveness is best determined roughly by scratching

with the blunt end of a pin on the face or neck; it also may often be determined by picking up the skin between the thumb and forefinger.

The great frequency of headache in this region from cause of all kinds renders it less easy to differentiate the region of reference than in any other area.

Any lesion in the region supplied by the fourth and fifth dorsal nerves is apt to show itself in the head by pain in the fronto nasal area. This fronto nasal zone consists of a racquet shaped area, the larger portion of the racquet lying above the root of the nose, and the handle representing the area running alongside of the nose, down to the alae nasi. It begins about two and one half inches above the root of the nose, and is then about one inch from the midline, and its diameter is about one inch. The point of maximum intensity is just above the root of the nose. It refers to disease in the upper portion of the chest, in the area underneath that supplied by the fourth and fifth dorsal nerve.

The *Fronto Temporal* region, as its name implies, covers part of both the frontal and of the temporal areas. The area begins about one half inch above the orbital ridge of the frontal bone. At this point it is about three and one quarter inches from the midline of the forehead, or in other words, midway between the midline line, of the forehead and the insertion of the ear. The area may be visualized

by placing the flat of either hand, with the fingers directed upward over the anterior part of the temple, so that the ulnar border of the little finger rests just above the outer part of the eyebrow. If both hands are used the fingers converge towards the centre of the forehead. The area covered by both hands will in a general way correspond to the fronto temporal regions. It is the part of the head to which pain in the region of all of the upper six dorsal nerves is often referred, and is the most frequent site of all referred headaches. For the most part however, it is pain in the region of the fifth and sixth dorsal areas that is referred to this region. This represents areas that correspond to heart, lungs and pleura.

The temporal area is just over the temporal fossa. It begins about three inches from the midline of the forehead, adjoining the fronto temporal region and extends outward about two inches. In height it extends three to four inches above a line joining the external canthus of the eye with the upper portion of the insertion of the ear. The maximum point is in the temporal fossa, just above the upper portion of the zygoma.

This area reacts to referred pain and tenderness in organs beneath the distribution of the seventh dorsal nerve.

The breadth of this area is about two inches at the widest part. It refers to the region about the base

of the lungs, the auricles of the heart, and the cardiac end of the stomach.

Vertical Region.—The vertical region is exactly over the vertex, and forms the posterior limit of the mid orbital and of the fronto temporal regions. A line drawn from ear to ear across the top of the head will form the base of this area. It runs approximately two inches down the front to near the hair line, and then runs back to the occipital area. Its maximum point is on top of the head, just in front of a line drawn from ear to ear. This is the region where one notes pain due to detachment of the retina, diseases of the uveal tract alone, and particularly diseases of the viscera immediately under the skin area supplied by the eighth nerve, such as the liver, diaphragm and stomach. On more than one occasion the finding of this area to be tender and painful, in the absence of a suggestive history, has led the author to investigate closely some complaint about the liver, with the result that a clue to the correct diagnosis has been found. The area extends over the abdomen, just above the umbilicus.

Parietal Region.—The Parietal area corresponds to the scalp in the neighborhood of the parietal eminence. It lies just behind the line running from ear to ear. The point of maximum intensity is about the parietal eminence. It is painful as an area of referred pain in affections of the abdomen and back corresponding to the distribution of the

ninth dorsal nerve. This painful area is very commonly merged with either the occipital or frontal areas. It refers to the Pyloric end of the stomach, and the upper part of the small intestine.

Occipital.—The occipital area occupies that portion of the scalp just behind the parietal areas, and above the suboccipital region. It is oval and extends two inches both right and left of the mid line at the back of the head. The maximum point of tenderness is just above the occipital protuberance, and a little to either side of the mid line. In the disease of the head rarely is this area painful, except when associated with disease of the posterior portion of the dorsum of the tongue. Generally this type of headache is associated either with pain in the abdomen, or with pain in the lower back corresponding to the distribution of the tenth nerve.

In enlargement of the liver, pain is felt in the tenth dorsal region, and consequently often in the occipital area. The intestines, ovary and testes occasionally refer to this area. Uterine pain is fairly commonly referred here, although the tissues over the uterus corresponds in its location to the twelfth nerve. However, when the uterus is diseased, a simultaneous affection of the ovary is so general that one may thus account for the referred pain. It also refers to the kidney region.

Below the tenth dorsal nerve, and above the third cervical, referred pain cannot regularly be expected.

The scalp tenderness disappears before the pain disappears in the corresponding area of chest or abdomen.

In a consideration of the referred pains of Heart disease the following principles may be stated: The ultimate cause of pain in mitral disease of the heart, is usually due to pressure in the auricles, so that in mitral stenosis the auricle is distended, and consequently the corresponding area of referred pain on the scalp is painful.

The area of referred pain for the aorta is the third and fourth cervical, and the first, second and third dorsal area; for the Transverse Arch the anterior surface of the neck in the Inferior Laryngeal area, that of the descending arch of the aorta refers to the fifth, sixth and seventh dorsal areas as well as back and head. This upper Dorsal second to fifth nerve distribution also represents the ventricle, and the fifth to ninth dorsal areas represent the auricle. In this way the area for ventricular pain is above that of auricular pain, and the corresponding change takes place in referred head pains in heart disease, i.e. the pain of the referred auricular area being above the ventricular area, but it is not so clearly manifested in the head.

This transposition differing from what one would ordinarily expect, is due to developmental changes. In the embryo the hinder end of the primitive tube doubles on itself, and is continuous with the vitelline veins. The anterior portion bifurcates, forming two

primitive aortae. Thus the heart is made up of three parts, the hindmost or lowest becoming the auricles, and the mid portion resulting in the ventricles, and the topmost portion the aorta. Then by doubling over the hindmost auricular part comes to lie above the middle or ventricular portion. Of course the primitive nerve supply remains as at the beginning, and for that reason the lower segments of the dorsal nerves occupy the higher or turned up portion of the heart, and are thus referred to the changed skin areas on the chest and in the head.

This is all of considerable value when one comes to assess the pain distribution in cardiac headache.

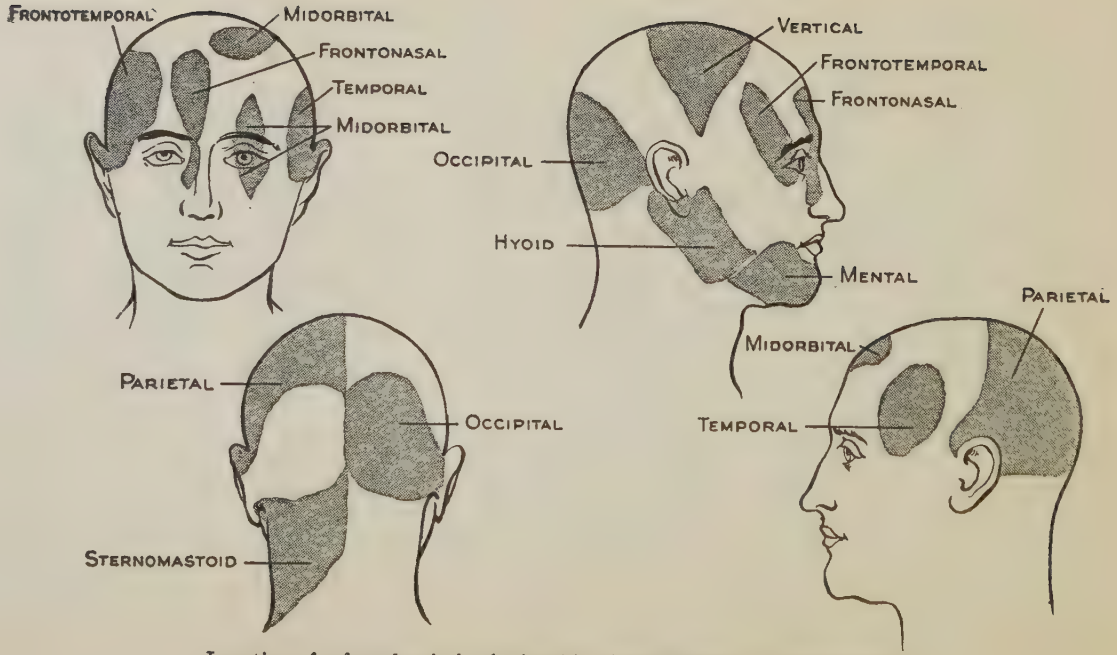
In aortic disease with disturbed compensation, head pain is common. Just as long as the mitral valve holds, these pains are apt to continue, but if in addition now a systolic murmur appears, the head pains usually cease. Pains in the chest and heart headache may change their location and that of these referred areas in the heart. At one time pain is due to pathology in the upper portion of the heart, then in the middle portion, and so on, and finally with enlarged liver the head pain may be vertical or parietal.

Sometimes in referred head pain of heart disease, the headache comes and goes, lasting a half hour or thereabout, and then disappearing. At such times there is often an associated inability to read, owing to pain in the eyes, and the practitioner may readily ascribe the trouble primarily to the eyes themselves.

The lungs have areas of referred pain in the second, third and fourth cervical areas, and from the third to ninth dorsal areas, but excepting in the fronto temporal and naso frontal regions are not very clearly defined on the skull. One notices that patients suffering from a Basilar Pneumonia complain almost always of fronto temporal pain, which is commonly ascribed to toxaemia. At a later period this pain frequently becomes temporal. When the apices are alone involved at times one notes mid orbital or fronto nasal pain. This interpretation of the pain makes the symptom headache in the Pneumonia patient for more interesting and profitable than when one dismisses the headache as a toxic one.

The following summary is taken from Henry Head, "Brain," Page 464—Nov. 17th, 1894, and epitomizes the subject.

Area on body	Associated area and on scalp	Organs in particular relation with these areas
Cervical 3 4	Fronto nasal	Apices of Lungs, Stomach, Liver, Aortic orifices
Dorsal 2	Mid Orbital	Lungs, Ventricles of Heart, Ascending arch of Aorta
Dorsal 3	Mid Orbital	Arch of Aorta, Lungs and Ventricles of Heart
Dorsal 4	Doubtful	Lungs
Dorsal 5	Fronto Temporal	Lungs, Heart occasionally
" 6	Fronto Temporal	Lower lobe of Lungs, Heart auricles occasionally
" 7	Temporal	Base of Lungs, Heart Auricles, Stomach, (cardiac end) ventricles
" 8	Vertical	Stomach, Liver, upper part of small intestine
" 9	Parietal	Stomach, pyloric end, upper part of small intestine
" 10	Occipital	Liver, Intestines, Ovaries, Testes and kidney
" 11	Occipital	Intestines, Tubes, Uterus
" 12	Occipital	Contraction of Bladder, Intestines, Colon, Uterus



Location of referred pain in the head in visceral disease. (*After Head.*)

Teeth.—Carious teeth may cause a temporal headache, that often grows worse at night, and prevents the patient from sleeping. Sometimes the teeth that are causing the headache are not locally tender. Usually in such headaches there are periods when the local tooth pain will be predominant.

In teeth of the upper jaw, especially molars, there is not rarely a severe boring pain radiating up to the temporal region over the same side. If there is another process in the body likely to cause such a referred pain as an acute nasal infection, or heart disease, etc. much care must be exercised in deciding which factor is at work. Tenderness of the tooth should cause one to have an X-Ray picture of the tooth. In the face of such a combination of causes one should not, merely on the evidence of an X-Ray picture showing a defective root, assure the patient that the removal of the tooth will bring everlasting relief and happiness. On the other hand, an error in not finding the real cause, when the tooth is at fault, produces much disgust on the part of the patient. One had better discuss the pros and con of the problem thoroughly with the patient.

The teeth frequently produce pain that is felt throughout the head. However, for the most part the pain of dental disease is local. Until the pulp is exposed the pain is local in the neighborhood of the tooth; when however the pulp is exposed the pain shoots in different directions. From that has

sprung the term "neuralgic" as applied to certain forms of pain signifying a shooting pain. After several hours of pulp involvement areas of tenderness in different parts of the face and head develop. Such areas can best be ascertained by going over the head and face with a blunt pin, and the patient will complain when the tender areas are reached, and at the same time the tooth then commonly aches more than before. When abscess forms, a peridental zone of inflammation is set up, which causes local pain about the tooth. When the nerve is dead the pain is entirely local. The two upper incisors produce such referred pain in the fronto nasal region, and the whole frontal region at times. This is the same area involved when the cornea is inflamed. This sameness of reference is doubtless due to the fact that both nerves supplying these regions come from the same parent structure in the embryo.

The canine and first bicuspid of the upper jaw when diseased are apt to refer pain to the naso labial area. The second bicuspid of the upper jaw refers pain to the maxillary and temporal areas on the same side.

The first upper molar causes pain and tenderness over the maxillary antrum.

The second upper molar causes pain over the whole upper jaw in front of the ear.

The third molar when diseased affects the same area. In the lower jaw the canine and first bicuspid refer pain to the mental area of the lower jaw.

The second bicuspid frequently refers its pathology to the neighborhood of the hyoid bone, and now it is a well accepted fact that pain in the region of the hyoid bone is in turn referred to the auditory meatus; hence a lower second bicuspid that is pathological may refer the pain first to the hyoid and then to the ear, closely simulating the pain of acute Otitis Media. The first and second molars of the lower jaw also refer pain to the ear, just behind the angle of the jaw and also to the hyoid area.

The wisdom tooth of the lower jaw refers its pain to the superior laryngeal area in the neck. In such a case the patient often complains that the collar rubs or irritates him.

It is usually in persons who commonly have referred pains from stimuli in other portions of the body who have headache from diseased teeth. Some persons are so constructed anatomically that referred pains are commonly present in them when there is any fault in the body mechanism. On the other hand the abscesses at the roots of the teeth, that may or may not be evident to the unaided senses, may be the foci of infection from which a toxic headache proceeds. So that in a doubtful headache case, X-Ray of the teeth should always be taken.

Neurasthenic Headache.—The usual headache that accompanies the neurasthenic syndrome, is not a headache in the ordinary sense of the word. It is not pain or hurt, but it is rather a feeling of

pressure on top or on the sides of the head; sometimes it is described as a tight band about the head, and a feeling of emptiness or fullness or throbbing, as though the head would burst. Frequently it involves the entire forehead; the feeling of tightness is often likened to a board on the forehead. So tight is this feeling that the patient feels that it is frequently necessary to lift his hat from the head and put it back, but less tightly. In others the complaint is of emptiness, of a lump of lead in the head, or that the brains are dropping out, or there is an iron band about the head, translated by the French as tete en casque.

A few examples of the bizarre complaints are as follows: A case may be cited where the patient, after a strenuous combing of the hair, complained of a sense of distress, but not actual pain, in the back of the head, and in another instance after washing the hair. Another case is a temporal head discomfort due to being hurried when at work, or because of annoyance. Here again it is a defense reaction. This headache was described as like knives stabbing her. Another complains of a lifting sensation, that occurs when in a close room, in a patient with nasal obstruction on both sides. The problem is whether the headache was a nasal one or one due to diminished oxygenation in a closed room. Sometimes the pain is confined to one side of the head, and is described as though the hair was pulled away.

Another, on the receipt of bad news felt as if struck by a violent blow on the head; no pain.

Another—Headache on right side of head from orbit to back, especially when excited from any cause. It is very likely to come on the day that she does not take coffee, and then it continues all day. Drinking coffee later on will not relieve it. The head discomfort does not interfere with eating.

Another—As result of nervous upset a head pain begins every day at four A.M. and radiates from the top of head down to the shoulders. Just before the pain begins to recede it is very severe. It never comes on until after she has been lying down for some time.

One patient at the menopause says every hair feels like a wire that is pulled, and cannot wear a hat because of the discomfort. The most discomfort is on the top and front of the head. Rest relieves it.

Another woman, just before menstruation, has the sensation as though her hat were too tight.

In full blooded nervous patients, a real severe headache often occurs at the top and front of the head; this is relieved by bleeding. The basis is not known.

Another—A young man whose top hair when brushed lightly against the grain causes pain. It is only the hair on the top of the head that produces this sensation.

Effect of smoking on neurasthenic headache: If smoking is indulged in, many of the patients

feel a sharp sudden pain in the interior of the skull. Such a headache may persist for some time after stopping the tobacco. Any noise at night while asleep may in some people bring on such headache discomfort. Another patient likens the headache to the sensation of horse-radish fumes in the nose.

These neurasthenic patients usually loose large quantities of hair, which is often ascribed by them to the constant head discomforts. Every general practitioner will recognize this type of headache as being the common everyday problem. On close questioning and re-questioning these headaches will almost always resolve into discomfort rather than pain, discomfort that other more powerful emotions can cause to temporarily disappear. Such a patient often says that she has suffered thus constantly and continuously for years. When such a statement is made, one is at once prejudiced in favor of this being a neurasthenic headache, especially is this so if the patient has been able to sleep in spite of the headache. Many of these patients fear that their complaints will not receive the attention that they feel is merited, and go to the other extreme by exaggeration. In order to impress one of the seriousness they will say that they neither sleep or have one minutes respite.

It is scarcely possible for anyone to have for years a real headache that always prevents sleep, without some other manifestation of a serious nature. These patients say they have severe headache at

one moment, and the next moment discuss the latest fad, gossip or fashion, without any apparent suffering. Such conduct is usually present only in the so-called neurasthenic headache. These neurasthenic headaches are usually worse in the morning, and do not keep the patient from sleep. Like other neurasthenic symptoms, they are frequently combined with a feeling of fear or apprehension; the patient often says that she thinks she has some mental defect.

In making a diagnosis of neurasthenic headache, one must always keep in mind that the neurasthenic, in addition to a neurasthanic head discomfort, may have a real headache from other causes. It is not safe to make a diagnosis of neurasthenic headache in the absence of other symptoms of neurasthenia. Frequently the headache is only complained of after some excitement or hurry. Cardiac headaches also occur under the same circumstances, but a careful examination makes it easy to differentiate such headaches, because a cardiac lesion sufficient to cause such symptoms is so plainly evident that usually a tyro will recognize it. In the neurasthenic cases rest commonly quiets the headache. Such headaches are usually frontal. When the headache returns after a prolonged rest, the head discomfort frequently takes on a different character; curiously enough the headache which is often complained of by the neurasthenic, often leaves a soreness to touch over

the region where the headache existed. When such discomforts and headaches follow an injury, it always raises the question whether or not there has been a permanent physical injury left as result of the accident. The presence of other neurotic phenomena tends to prejudice one that there is nothing organically wrong. In the absence of pressure symptoms one is commonly not warranted in assuming that any pathology is present.

This headache must be differentiated from Migraine. Both are more common in women during adult life, and both often occur in the same individual. In the absence of a family history of Migraine, and the absence of nausea with the attack, then if sinus disease can be eliminated, a one-sided pain is more likely a neurasthenic headache, rather than migraine likewise the presence of other neurotic symptoms, as vertigo, fears, etc. speak for a neurasthenic headache, rather than for Migraine.

In a fair proportion of cases both forms of headache occur in the same person, and in taking the history the patient frequently mixes the symptoms, so that one must pick apart both headaches. If this is not done, measures that tend and succeed in alleviating the one headache will be regarded as not successful by the patient, because the other headache is still present. After the difference between the headache or head discomforts is pointed out, the patient will usually himself readily make the

differentiation. The same thing happens where there is a combination between true neuralgia and a neurasthenic headache, but in this former complaint the pain is so severe and so different that as a rule the patient himself without any suggestion calls ones attention that the pain is different.

These associated headaches are the most frequent causes of confusion. It must always be recalled that a patient with a well marked neurasthenic head discomfort is just as apt to have a sinus headache as other people do, and one may be easily led astray as to the chief complaint. It must not be forgotten that the early morning headache of hunger may be confused with a neurasthenic headache.

When buzzing is present one should never neglect to make a close examination of the ears; likewise in the presence of dizziness especially with headache one should always carefully test the ears for internal ear disease. One is so apt to class all of these associated symptoms as just one more complaint of neurasthenic origin, whereas there is no reason why a patient suffering from a head discomfort of neurasthenia should not have disease of the ear as well.

In many instances in addition there is a real suboccipital headache present. It is frequently initiated by tire, fatigue, and other muscular strain, and is often relieved by a pillow placed under the head. In such a case it may be classed as a true mechanical headache. These discomforts are also

initiated by mental exertion, or occasionally by some physical strain. In attempting to arrive at a conclusion as to the nature of pain in the neurasthenic headache, one should ask "Is it a real pain or hurt?" The first doubtful "Yes" is changed in a moment or two to "No." It is not pain in the usual meaning of the word.

D. H. F. (Disordered Heart Function) cases, in addition to their multitude of complaints, often mention headache. For the most part there is a repetition of the complaint of headache, just as in the neurasthenic, which in the last analysis is not a true headache. However, occasionally a true headache is present. Such a nervous headache is usually made worse by exercise, and is frontal in location.

Closely connected with the above is the headache of over-active thyroids; in fact it is difficult to separate the two. This symptom sometimes also occurs in patients who take thyroid; generally a band-like feeling about the head is complained of, or occasionally a frontal headache at the hair line.

In the same category is the head discomfort due to thyroids swollen because of functional engorgement. Such patients will often complain that they felt that something snapped in the head, but there is no acute headache. This often accompanies smoking. When the connection with smoking is recognized smoking should be forbidden.

I am convinced that in many, if not most cases, the tendency to the development of this neurasthe-

nic symptom is an inherited one. One may object that neither the patient's parents or grandparents exhibited this instability, but on the other hand the ancestor was probably never subject to such multitudinous impressions as the member of this generation is subject to, with its noise, hurry, loss of sleep and use of stimulants, etc. If such stimuli had been approximated in the last generation, in nearly every instance one of the ancestors will be spoken of as being nervous, or having had nervous prostration headache.

As to outlook, in the neurasthenic headache one may always promise complete relief, but the date of cure must be more or less nebulous. The duration of the cause of the neurasthenia, whether it be mental or physical, is of course the basic factor. If it is associated with the menopause a year or two later will usually show a marked diminution in the discomfort. If a high blood pressure is also present, the possibility of its becoming a true arteriosclerotic headache must be kept in mind, although the sequence is rather uncommon in practice. A quiet life, or a Weir Mitchell cure, are also determining factors.

Hysterical Headache.—As distinguished from the neurasthenic headache, hysterical headache is localized, often tender to pressure over the affected area, and is in classical cases confined to the top of the head. It is described as being like a nail being driven into the skull. Some of these patients have

widely dilated pupils at the same time. Of course the hysterical person may also have other forms of headache as well.

In these cases it is folly to assume that such headaches have no pathology. In anyone complaining of such headaches, as well as a multitude of other neurotic phenomena, it is our duty to find out the real cause, whether it be too long hours, disgust for her daily work, focal infection, etc. It is commonly easy enough to give temporary relief, but permanent relief is a far more difficult problem.

After this it is well to discuss with the patient the cause as to why such headaches occur, because when the patient thoroughly understands the situation, co-operation is much more easily obtained Any form of over-stimulation, whether it be physical or mental, is apt to induce such a headache.

Such headaches are a defense reaction against more work than the patient is able to do. In these people even a slight head discomfort supplies the reason, and it is exaggerated until relief is obtained. Whether this is associated with other neurotic phenomena is immaterial. In the last analysis it is nature's way of causing the patient to rest.

Neurasthenia. TREATMENT.—The headache, or rather head discomfort of Neurasthenia, whatever the ultimate cause may be, is a very difficult affliction to cure. In the management of such a patient one must continually shift from one expedient to another. The thorough physical examination and careful

refraction which should always be done, will give relief, in many cases, because of the confidence engendered. At the first visit the patient should be given a prescription for twenty grains of Bromide of Soda, in liquid form, to be taken three times a day, and to be continued for three weeks. This will give temporary relief in nearly all patients of this type: (one should avoid the use of tablets of Bromid so often prescribed). Objection may well be made that such relief is not permanent; this is true, but the first principle in the treatment of any chronic disorder, is to secure the patient's confidence, and this can only be done when results are obtained from the medicine or directions imparted. The first results must as a rule be obtained through relief of the digestive symptoms, or of sleep because relief of these symptoms are visible evidence of success to the patient. Frequent meals, with adequate rest after the meals, by lying down for at least an hour, if this can be accomplished without interfering with the routine of the house, are advisable. Every three hours some form of noruishment should be partaken of, preferably milk between the meals. The best evidence of a growing cure of the neurasthenic is the addition of a pound a week in weight. In no event should she have less than ten hours a day in bed.

Every time such a patient is seen, (and they must be seen frequently by the physician, no matter how disagreeable it may be to a busy man) all of the

complaints must be noted and written down, and at each successive meeting they must be checked off, and new ones added if present; those eliminated are called to the attention of the patient and emphasized. By a gradual elimination the patient will admit that she has not this or that complaint, among others, the so-called headache. At the next meeting it is easy, by referring to the notes, to show her that such and such a complaint, as for instance the headache, was absent at that time. By her gradually realizing that she has not had the complaint constantly, it ceases to become a fixed feature in her memory. The fact of this disappearance must be featured and emphasized; this encourages the patient that he or she is making progress, and does much to dissipate the fear psychosis which is aways present. Losing his headache on one or two occasions will do much to prevent the patient from saying that it is *always* present, and unless it have a pathological foundation it will gradually disappear from the realm of consciousness, and then cure is affected. To bring the patient back to the doctor for this psychic treatment it is always necessary to provide some sort of symbol, or physical treatment, that appeals to the senses, otherwise to come back and to be told to "Just keep on the last bottle" will soon tire the patient.

In a woman, frequently the use of a tampon, especially where there is uterine pathology, is productive of marked relief. If there is any symptom

referable to the genital tract, even when there is no marked pathology present, this measure of tamponade impresses the patient that the physician is trying to do something to relieve her distress. It should be done twice weekly. In any event some symbol is necessary.

In the management of any of the symptoms of neurasthenia, one must strive to improve the neurasthenia as a whole. Inquiry into the hours of sleep, the mental attitude of the patient toward others in the house; the use of stimulants, tobacco, coffee and tea, (all of these should be severely interdicted); the regularity of meals, and sexual matters in particular must be normalized. Certainly one should not tell unmarried people that sexual life is necessary, as is so often done when the physician has got to the limit of his resources, and wants to order something that may be difficult or impossible of fulfillment.

In dealing with the sexual complex, much care must be exercised not to attract the patients attention to the sexual apparatus, as in many instances the patient has already made it almost a monomania. Casual reassurance that past sexual disturbances will not affect the future is often good therapy, and gets rid of some phobias. This applies particularly to youths who have read in the literature of quacks, that all sorts of dire punishments will be visited upon them for their supposed sins. This matter may at times be broached to unmarried females,

but it is a difficult subject to approach. Needless to say it should always be brought forward in a discussion with married people, as the sexual complex is one of the most fruitful sources of neurasthenia in married people. Frequently very severe headaches are met with in multipara who have had many labors with little intervals between pregnancies, and who have had the care of the children, particularly if the children are not nursed at the breast.

A menthol cone or ointment of methyl salicylate applied to the forehead or temples by its cooling effect often gives the patient much relief. If the galvanic current be employed, the current may be passed through the head in the following manner: An electrode should be applied to the head, using a large anode bent to the shape of the forehead, and the kathode to the suboccipital region, using about one milliampere of current. The seance should continue for about ten minutes once a day for three weeks; or the anode may be applied to the neck and two electrodes at both angles of the jaws, using one-half milliampere for the same length of time. Undoubtedly patients are improved during the course of the treatment. It is quite necessary to explain to such patients, with all of the eloquence and positiveness of the detail man, the rationale of this treatment and it is necessary that the physician have some faith in the measure as well.

The head discomfort of the neurasthenic, particularly the symptom that the head is too heavy, is

sometimes relieved by placing two or more pillows behind the shoulders supporting the neck and back of the head. A suitable apparatus may be constructed by any handy man to support the pillow. Such a head discomfort is doubtless often partly mechanical, due, (1) to the inability of the weak neck muscles to hold the head in place; as a consequence of this the drag on the neck muscles and nerves must be considerable. A tight band about the forehead relieves some of the band-like feeling. Likewise in such cases reading should be interdicted, and the eyes should be spared as much as possible by removing sources of bright light, etc. avoiding sitting near or fronting a bright window, etc. Darkness should be sought as much as possible, and the sun glare of the ocean avoided.

Medically, bromides and their cogenors will be found the most efficacious type of drugs. One strives for rest of all of the organs both night and day, and the treatment of such head discomfort is a long tedious process, but if persisted in along these lines is always successful.

Sleep must be secured at all hazards. Frequently the use of dark shades in the room at night, and the elimination of all light in the morning is serviceable in accomplishing this purpose. The sleeping room should resemble the inside of a camera, both night and day.

These patients progress better in a climate where they are away from the glare of the seashore; some-

where in a cloudy place or in a forest one gets best results. They crave sunshine, and yet the after effect of sunshine is always far from good. Northern latitudes are to be preferred when possible, in fact few of these patients seem to make much rapid progress until they go away to the moutains; in Europe the hilly regions of Scotland or of Ireland are to be preferred. In this country the north woods and Canada are the happy hunting grounds of the neurasthenic. This change should be approximately a month in duration. Short vacations, as week ends, etc. do not serve any useful purpose. The disturbance of going and coming, the preparation, etc. all serve to really make their head discomforts worse. It is the freedom from care, from preparing meals, etc. thet accomplishes most good. The longer the patient is away the better. Usually she will desire to come home after a few weeks, but it is necessary to prevent this. While away, if in a hotel, when it is possible the patient should not eat at a large table, but rather at a private table, or in a private house. Often in a sanitarium or hospital the sight of others similarly afflicted, yet getting well, is an added stimulus toward the recovery of the patient. For that reason the plan of treatment in most of such institutions is to keep the patient busy every hour of the day. However, most neurasthenics in the acute stage do better with absolute rest. Inasmuch as most of the cases are ill for a long period before going to a sanitarium the scheme of a

regular cycle of massage, etc. works well in such institutions.

In some institutions the ingestion of large quantities of milk, as much as two to three gallons a day, with rest periods, is remarkably successful. The best results are achieved in young erethistic individuals. If milk agrees with the patient, the results are often remarkable. This is known as the milk cure. If the patient does go out in the sun for any lengthy period, colored glasses should be worn. This is quite true even if she is at home. Because of this fact there has arisen the so-called "colored glass" cure of neurasthenia.

As to the ultimate cause of the neurasthenia, many follow the dicta of the French authors, who believe that the cause is frequently in the gastro-intestinal tract, and as a result the cure by high colonic irrigation has now become the fad. In all of the large cities there are scores of nurses and doctors with high colonic apparatus for washing out the bowels of those who actually eat too much. Undoubtedly the patient feels better; his head discomfort is lessened, and his mind is clearer after such a treatment so that it is difficult to convince him that the bowel is not the ultimate cause. As a matter of fact, the result is much the same as occurs after a dose of castor oil has operated, but high colonic washing is much more rapid and more pleasant, and is a useful form of psychotherapy. There are some practitioners who suggest that the condition is due

to changes in the nerves of the dura, from toxins elaborated either by fatigue or otherwise and they employ baths lights, rays, etc.

Finally, to sum up, ten hours in bed should be the absolute minimum; a complete physical examination should be made, also a written list of all of the symptoms complained of. The patient is given a large dose of tincture of hope; there must be no doubt in the patient's mind as to recovery nor in the doctors mind and there must be no neglect to impress this faith upon the mind of the patient at each visit, independently of whether she asks it or not. Any physical measures needful for the alleviation of the symptoms of the neurasthenic should be employed, also, if thought advisable, one or more of the glandular extracts, the mechanism of whose action should be explained to the patient, of course omitting to mention the fact that commonly their effects are difficult to recognize within several weeks.

A cure can almost always be promised, but that it will require time, possibly six months or a year, must be emphasized.

Headache of Insomnia.—Many people who suffer from Insomnia experience a dull temporal headache on the morning after a sleepless night. The frequent association of neurasthenia with such a syndrome demands close questioning as to the character of such head pain. It is relieved by a tight bandage encircling the forehead, and by a cup of strong tea or coffee.

Vasomotor Headache.—Such an attack is initiated by emotional excitement, and is frequently associated with red blotches on the face, somewhat resembling urticaria, but not raised or itchy in character. There is flushing of the face and eyes; the red skin feels hot; the pulse is full and hot. It is called Cephalalgia vaso motoria. It is often combined with other vasomotor disturbances, as urticaria. The attack is sometimes brought on by excessive smoking, alcoholism, etc. This type of headache is not common in this country at the present time. Closely related to the above is the following:

Fatigue Headache.—Fatigue Headache is seldom seen by the physician. In this so-called neurasthenic fatigue headache there is in addition to the headache a feeling of pressure about the head, as if the temples were held in a vice, or that an iron band surrounded the head. Any physical or mental strain may bring on such a headache. It is common in those who are accustomed to work indoors, and who then perform a day's work or play in the open, or vice versa. Parmenter suggests that those with unstable vasomotor systems, those who blush and sweat easily, whose heart accelerates easily, have very active tender reflexes, are more prone to such headaches than others not so constituted. It has been suggested that the physiologic products of fatigue in muscles and nerves may well be the cause of the vasomotor upset.

Fatigue headaches are closely related to the headache of eye strain, especially where the fatigue is due to over use of the eye muscles. This is best exemplified in the headache so commonly present in women who have been shopping and have thus been using the eye muscles to a very great degree. Likewise, this is common in those who visit museums; in telephone operators; or in any who use their eyes energetically. There are other fatigue headaches associated with over exertion in other portions of the body, but they are not so common or so severe as those associated with the eye muscles. It is, usually, a brow headache. Some relief is afforded by a tight bandage about the head.

TREATMENT.—The headache of fatigue is commonly relieved by a strong cup of tea. It is often stated that China tea is more efficacious than any other tea. Where this fails, or where medicine is necessary, Guarana, gr. x, is indicated. It may be argued that Guarana is identical with Caffein. Chemically it is so, but physiologically it is different, just as yellow phosphorus is physiologically different from red phosphorus; yet it is chemically the same substance. In any event, when any fatigue, or so-called nervous headache is to be treated, Guarana is an exceedingly valuable drug, either in combination with Acetphenetidin or alone.

Bathing the forehead with a mixture of Spirits of Camphor, and Spirits of Lavender, equal parts,

is very grateful. A Menthol pencil rubbed over the forehead is often soothing.

Headache of Seasickness.—Sea-sickness or train sickness is sometimes associated with reflex headaches. This phenomena has its origin in the internal ear, and because of the association with the sea sickness is easily recognized, and is best treated by the use of bromides and rest in the recumbent position. A hunger headache may easily be mistaken for such a headache, and usually a therapeutic test with tea or food will determine the cause.

TREATMENT.—The headache of sea sickness or train sickness is best relieved, if the patient can take medicine, by a large dose of bromide. This failing, try the first formula, (see treatment) and absolute rest in the complete horizontal position.

Menstrual Headache.—The headache associated with menstruation is often referred to as a reflex headache, and yet it is often due to a coincident swelling of the covering of the turbinate bones. It is generally the middle turbinate that is at fault. It is a matter of experiment to find out whether such contact is evident between the turbinates and the septum if the headache is present at the same time, Then it is fair to assume that the headache may be due to the reflex turbinate swelling. The nose should now be thoroughly sprayed with adrenalin and cocaine. If relief is obtained, this is prima faciae evidence as to the nose being the cause. Then a linear cauterization should be made over the turbin-

ates at the point where contact is made, with trichloracetic acid, or some other cauterizing agent. At a later period the tissues that make contact in the nose may be removed, if necessary. Where cauterization is done it will be necessary to repeat the operation every year or so. It is very important that no opinion be given as to the nose being a cause of menstrual headache, unless the examination be made during the menstrual period, and while the headache is present, as at other times contact may not be evident. Some patients speak of a snapping noise in the head just before menstruation; this is doubtless due to swelling of the turbinates or of a closure of eustachian tubes. Another explanation of the menstrual headache is that it is due to the swelling of the pituitary gland. According to this theory when the pituitary is confined within a small closed sella tunica the gland is compressed; inasmuch as the pituitary always enlarges in menstruation, varying with the individual, it is easy to visualize such an enlargement as the cause of the headache.

The headache that accompanies menstruation is an everday phenomena. In a few instances the headache alternates with cramps in the lower abdomen. Usually however it is independent. In some patients it precedes the menstrual molimen; in others it occurs during, and in others it follows; occasionally it is present exactly twelve days after the period, or at the time of ovulation. Often it is

accompanied by nausea, and sometimes by dizziness. Nausea is more common in temporal headaches. Some patients ascribe relief to vomiting. It varies as to location. Sometimes it follows the distribution of the occipital nerves, in other cases it follows the distribution of one or all of the branches of the fifth nerve. Facial and nasal abnormalities seem at times to be factors in its distribution. Often it is so severe that sleep is interfered with. Subjective sensations of heat and formication frequently accompany it. Most adults recognize it as a menstrual headache, but in children and young adults it may be overlooked.

TREATMENT.—The headache that accompanies any of the phases of menstruation is best treated by Aspirin (Acetylacid Salicylicum) in from five to ten grain doses. In some nervous women the addition of seven grains of Guarana to the Acetylacid Salicylicum (Aspirin) is of decided benefit. Rarely Cannabis Indica in grains ⅛ of the extract, may be added.

Uterine Diseases and Displacement.—Disease of the uterus and adnexa frequently produce changes in the erectile tissues of the nose, similar to those present in menstruation. In other instances toxaemia due to pus infection in the pelvis represents a different type of headache, such as has been described under focal infection. There can be no doubt that there is such a thing as reflex headache due to malposition of the uterus, although manny deny the

connection. Such headaches come on after exertion, and after anything that tends to congest the uterus. Because of the association of other neurasthenic symptoms the headache is classed as just one more neurasthenic symptom. However, it may be a real headache. Such headaches are relieved by hot douches and by tampons. These headaches are mostly occipital, or on the crown or on top of the head; they are also known as coronal headaches; they are often present on awakening in the morning, and closely resemble the neurasthenic headache. When they occur during the day they are often relieved by lying down, or if the uterus is enlarged, by the insertion of a tampon or a ring pessary. Frequently a sense of soreness of the scalp remains for a day or two after the attack. The pain is often associated with other evidences of neurasthenia, and frequently one must resort to a therapeutic test by use of tampon in order that one may separate the headache from that due to neurasthenia. Often the pain is referred down the neck. Neurasthenic headache is often referred in the same way. By pressing over the Styloid process, and observing the reaction on the part of the patient, one can assess the extent of suffering experienced by the patient.

Coronal headache is peculiar to pelvic disease. Occasionally the headache and the pelvic disturbance have a common constitutional cause, and the removal of the pelvic disturbance or mitigation of this, will relieve the headache.

TREATMENT.—Uterine headache is so commonly bound up with other pains and aches of a neurasthenic order, that manny clinicians have come to regard it as the same entity. The combination with constipation is almost always a complicating factor; yet we know that the removal of the offending organ, or replacing it, will *often* turn a long suffering woman into a new, lively and vigorous female. So treatment must be directed towards the genital tract.

Headaches due to uterine disease and displacements, are best relieved, temporarily, (1) by Acetylacid Salicylicum, (Aspirin) and (2) by properly placed tampons. In fact the tampon may be used as a measure of diagnostic therapeutics. After carefully searching for a cause of the headache, and not finding any pathology elsewhere in the body, then even a slight disease of the uterus or appendages should be treated. Even very slight ulcerations, polypi, etc. are sometimes responsible for such headache. In the absence of the possibility of treatment by tampon, the patient should be advised to spend a few hours daily in the Sims position, or in the knee chest position, allowing the air to enter the vagina. This measure will often be a "God send," and afford a good night's rest to patients suffering from the headache of uterine disease. The first prescription given above will usually give temporary relief.

This brings up the subject of the value of ergot in headaches. Some excellent clinicians testify as to

its value, but on the whole it has almost disappeared from the therapeutic armamentarium. In selected uterine cases it does relieve headache. It would be unwise to judge this phenomena of relief on the basis of physiology. I say this because the physiology of to-day may be a very slender reed when one comes to compare it with the physiology of to-morrow. The cases must be selected, and the omission of specifying the cases to be selected for its use has so deceived the practitioner who has read in a text book that ergot is good for headache, and who after trying it and finding it wanting, causes him to say "*Falsus in uno, falsus in omnibus.*" The same holds true of Cannabis Indica. At times it is an exceedingly useful agent in headaches that are associated with uterine disease. I believe that it is in the cases associated with a profuse menstrual flow that both of these agents do most good.

Hot full baths for the headache of the climacteric are often efficacious.

GENERAL PRINCIPLES IN DIAGNOSIS

General Differential Diagnosis.—To differentiate a head discomfort from a real headache, one should consider, (1) the type of individual, (2) the age of the patient, (3) the absence of habitual vomiting and true vertigo, and other symptoms. (The neurasthenic frequently complains of dizziness, but when this is carefully analyzed it is easy to note that it is not a true vertigo); (4) the Persist-

ence or the evanescence of the headache, (5) the frequency of recurrence, (the immediate cause of such recurrence being often due to psychial causes). Arteriosclerotic headaches are often indistinguishable from true neurasthenic headache or head discomfort. In middle aged patients when in doubt such headaches should be considered to be of arteriosclerotic origin. As corroborative evidence there might be considered the increase of blood pressure, the change in severity of the headache on standing up or lying down, and the bad effect of alcohol.

A method of some value in differentiation of the cause of the headache consists in assessing its combination with associated symptoms.

Headache Combined with Other Symptoms.— Headache with Coma, is usually due to an organic lesion in the brain. When the *headache* occurs with delirium, in the presence of fever, it is generally an infection without fever it is likely to be due to an *organic lesion* of the brain. A combination of *headache* and *vomiting* suggests an *organic* lesion, provided one can exclude the Toxaemia of fever, Uraemia, Migraine, Alcoholic excess, and a Gastro Enteritis.

Acute headache associated with *vertigo*, suggests a *digestive* upset, plus a disturbance in the ear. One may generally assess such ear trouble by using the watch to determine roughly the relative acuity of hearing. It is worth while to test the hearing by the watch, in every vertigo because if chronic, it

suggests a brain lesion, or a chronic aural lesion. Headache combined with vertigo is not uncommon in myopia. Headache with somnolence, not true sleepiness, suggests either a malaria or an anaemia as a cause. The combination of headache with vertigo, in a child, in the absence of ear disease, is often indicative of tubercular meningitis.

A dull headache is common in toxaemia from dyspepsia. A *pulsating* and *throbbing* headache is common in vasomotor disturbances; it also occurs in *Migraine.* Hot *burning headache* with the sensation of sore skin, occurs commonly in rheumatic and anaemic headaches. It usually means a toxaemia of some kind.

Sharp boring pains occur in Hysterical headache, in Epilepsy, and in Neuroses.

Combined Headache.—In the differential diagnosis between Typhoid fever and Malignant Endocarditis, the absence of frontal headache at the commencement, is strong evidence against the presence of Typhoid Fever, and is in favor of malignant Endocarditis. Of course this is not absolute, but it is of relative importance.

The headache of Arteriosclerosis is often combined with the symptoms of mitral or of aortic disease. Likewise an Indurative headache often accompanies heart disease.

Pain in the *tempero frontal* region is present in diseases of the aortic region. Pain in the temporal region means involvement of the mitral opening.

The loss of hair in persons who suffer much from headache is fairly common, but it is difficult to determine any causal relation.

Diagnosis.—Headache must be differentiated from Tic Doulouroux. In this condition there is an instantaneous severe pricking pain, never continuous. The pain is most agonizing; in fact if it were to be continuous no one could stand it. There is usually present some other defect of the nervous system.

Neuralgia.—Neuralgia is very common in diabetics. In the head it is in the distribution of the fifth nerve that it manifests itself.

The neuralgia of Anaemia, whether from primary or secondary Anaemia, is a well established clinical entity. That neuralgia is the cry of the nerves for food is an axiom that serves to call one's attention to this entity. As has been stated, Chlorosis, which was formerly the commonest cause of Anaemia, is now almost extinct in this country, and is a rare cause of neuralgia.

True Trigeminal Neuralgia is rather a face ache than a true headache. We have often observed complete cure by the daily administration of Castor Oil for two or three weeks at a time. The injection of Alcohol into the offending branch of the nerve is of course more generally satisfactory.

It generally involves one branch of the tri-facial, most commonly the second or middle branch. It recurs from time to time; generally there are warn-

ing stitches before the onslaught; when very severe it involves all of the branches. There is usually a neurotic basis, although the actual cause must always be mechanical. If one can find the focus, or cause, such as antral disease, the outlook for cure is good. There are many cases of sinus face ache that closely resemble tic dolouroux.

Ear.—In labyrinthine disease the causal picture is the same as in the middle ear disease, plus the intense vertigo. This must be differentiated from tumor of the cerebellopontine angle.

Location.—Ocular or nasal headache frequently points to high blood pressure, to diseases of women, to autointoxication, to neuralgias. If the sinuses are involved local tenderness is the rule, and it serves to differentiate the cause at once.

Vertical headache may be due to (1) Teeth, (2) Sphenoidal sinus disease, (3) Inflammation of middle turbinate and the septum, (4) Disease of the liver and other organs in the region of the diaphragm. Rarely does Indurative headache affect the vertex alone. The question as to whether the turbinate or the septum is the likely cause of such vertical headache, may be ascertained by introducing an applicater between the septum and the turbinate, when severe headache will be experienced if the nose is the cause.

Time of Day.—Morning headache, when acute, is commonly associated with sinus involvement. When chronic it is commonly due to a

nephritis; rarely to eye strain when it is due to the irritation of light on opening the eyes, or to the fact that the eyes were used much the night previous. Eleven o'clock in the morning headache is usually sinus headache. Intestinal stasis is sometimes the cause of a morning headache. It is commonly associated with a sense of bad taste in the mouth on awakening.

Evening Headache.—Among chronic cases at least 90% are due to eye strain. The specific syphilitic headaches are in most instances evening headaches, but the pain is more marked during the night than any other headache. It must be noted however that rarely a specific headache occurs during the day as well. Finally, to sum up the diagnosis in a paraphrase, one may regard headache as an adverb, a "how, when, or where" query

How —Kind of pain
When —Time of day
Where—Portions of the head, unilateral or bilateral region.

As was pointed out in the beginning of this work, the first point in arriving at a diagnosis is to really find out what the patient means when he says he has a headache. One must differentiate (1) queer feelings in the head labelled as band-like, sense of weight on head, as though the sutures would open, or as a knocking sensation; (2) other vague descriptions, head pains, i.e. pain sharply localized in

various portions of the head; sticking pain, such as one would expect in a supra-orbital growth, as that of a cut, or as certain forms of earache; (3) soreness to touch, such as eruptions or soreness left after a headache; in other words a superficial soreness transmitted by the nerves of the outside of the skull. Sometimes there is already a pathological condition present which is not noticed until the headache occurs, and this leaves that region painful to touch after the disappearance of the major headache. In one instance a sebaceous cyst was the only noticeable portion of the skull tissues that was sore to the touch after a headache. A similar condition follows in the scalp of some women after the headache, so that they must remove the hairpins from the hair because these articles appear to cause pain or soreness by their touch. This is a fairly frequent phenomena in arteriosclerotic headaches of old persons. (4) Real headache.

In the examination of the patient for an *obscure* headache, one should have a list of the probable, as well as possible causes. In rare cases it may be advisable to give such a printed list to the patient, with a list of leading questions, as often the history obtained on the second visit will be materially different from that obtained on the first visit. The newness of the questions is often responsible for the failure at first to answer the questions accurately. However this will rarely be done.

First, one should make a general and complete analysis of the family history for headachy and migrainous ancestry.

Headachy people get headaches on the least excitement, on the occurrence of menstruation, digestive upset, or on any bodily disturbance such as constipation; this tendency is commonly inherited. Bromide, in xx grain doses does better with such people than the coal tar derivatives. If a headache, which had always affected one part of the head, is cured, that part is very prone to be the seat of any future headache, no matter what the cause may be, as, for instance, a headache resulting from a localized meningitis, which disease disappears eventually, and at a later period, a cerebral congestion arises from some entirely different cause, as constipation; then the new pain is commonly referred to the site of the old meningitis.

One must determine (1) whether a former infectious disease may be the cause of affecting one of the cranial nerves or the meninges; (2) whether trauma may be the cause of a similar lesion of the meninges or of the cranial nerves; (3) whether the occupation may be the cause, as in the case of lead workers, etc. (4) whether ordinary faults of hygiene, as alcohol, the toxaemias of constipation, etc. and lastly, (5) whether the ordinary environment of the home is conducive to its production, as worry, ill nature, etc. Factory hands, shop girls and desk workers are prone to headache, from the long continued mainte-

nance of a cramped position of the neck muscles pulling on their occipital attachment, and on the nerves contained within them.

A complete physical examination is made; then all of the cranial nerves are investigated, the reflexes examined, the reaction of the sympathetic nervous system, and lastly the endocrine system; in addition the blood, urine, Wassermann, transillumination, and X-Rays of the skull and teeth.

In most cases the cause of the headache is quite obvious at the first examination. The head colds, the infections, and the Gastro Intestinal system constitute the most frequent cause of such headaches. In perhaps 75% of the cases this is so, but finding the cause of the remainder necessitates following some sort of schema much like a chemical schema to find the unknown metal in a specimen. For that reason the appended form of examination has served the writer quite well in elucidating a difficult case.

Inasmuch as there are over one hundred and sixty known causes of headache, one must have some definite schema or method of determining the cause of the headache in a doubtful case. In arriving at a diagnosis a schema of questioning as below is of very great service.

(1) One should ask in every case is the pain *acute* or *chronic;* how long has it lasted.

(2) Is it unilateral or bilateral

(3) Locality

(4) Local tenderness; is it deep or superficial, constant, intermittent or remittent,

(5) The incidence of the headache, and variation during the day; character of the pain, paroxysmal, throbbing, boring or dragging; a feeling of tension, aching or of pressure on the head.

(6) Is it produced or aggravated by any position of the body?

(7) Any other complaints of either the gastro intestinal or urinary system, rheumatism, etc.

SCHEMA No. I

How: Pulsating?
Throbbing?
Constant?
Dull?
Accompanied or followed by soreness to touch?
Persistence and recurrence?
Does the head feel hot?
Does it beat?

When: Day or night?
Time of day?
Any periodicity?
Any connection with menstruation?
Does it vary more by stooping, running, etc. or by mental exertion?
Better or worse in the open air?
Does change in the weather cause any change either in intensity or frequency?
Affected by cold or heat?
Affected by washing hair, or by head injury?
Affected by conditions of life, as work, etc.?

The duration will be longer in toxaemias. Position of the body, as by bending, will suggest blood pressure changes.

The time of the day is of considerable import. In the morning it is likely to be due either to Nephritis or to nasal or digestive disturbances.

Where: Location?—using both hands to point out the region, unilateral or bilateral;

If unilateral the nose is quite likely the cause, and the eyes may be ruled out. The locality will suggest the reflex areas. Local tenderness will suggest a local cause.

Head zones.

Nature of pain: Sharp?
Stabbing?

Schema No. II

Short formula for examination of patient in a doubtful case:

Questions: When did the pain begin?
Where is the pain noted?
Is it one-sided?
What time of day?
How long has it lasted?
Is it accompanied by other symptoms?
By dizziness, temperature, nausea, dislocated kidney?
Heredity, Habits?
What kind of pain?
Constant or intermittent?
Throbbing?
Does it allow the patient to sleep?
Any relation to menstruation?
What makes it worse?
What makes it better?
Any injury or illness as a likely cause?
How long has it lasted?
Location?
Time of day?

Any combination of different kinds of headache;

Any combination of different kinds of headache plus soreness of the scalp.

DIAGNOSIS.—One kind of headache may be aggravated by one due to another cause, as that of eye strain, to which has been added a fresh head cold, or the combination of a chronic headache from sinus disease and from eye strain. A head cold occurring during the course of the onset of typhoid fever is a combination which may easily lead one astray. The typhoid headache is a dull constant headache, to which is added a violent recurring headache, with soreness to percussion, especially tender over one side. There is present always a tender Ewing point on that side.

Combination of headache with other symptoms, such as uterine prolapse:

Headache after fainting usually means an epileptic attack rarely is it due to the heart.

Hyperaesthesia of the scalp occurs in all kinds of headache, whether organic or functional. It persists so long, without any other symptoms, that, from the standpoint of differential diagnosis, it must be regarded in a different light from headache.

No gross fault or lesion accounting for the symptoms being found, the patient is then referred for a complete and thorough eye examination. One should examine the nose, this to be supplemented by finding whether the spraying of cocaine or adrenalin to one side will banish the headache, or if necessary the application of sufficient cocaine to relieve pressure at points of contact. If the cause is not found here, an X-Ray of the sinuses and a

transillumination should be done, and a blood count and accurate temperature night and morning should be taken.

Prognosis.—Headache is, as a rule, a fleeting symptom, and recovery can almost always be predicted. In Gastro Enteric cases from ½ to 1 day, in febrile cases for 3 or 4 days. Where it is the result of recent injury then in the aged a period of six months or more is likely to intervene before cure, and the likelihood of head discomfort or of occasional headache for years to follow is quite common, although some escape this entirely. From the amount of physical injury inflicted it is not possible to gauge the length of severity of the headache, as we have noticed severe and constantly recurring headache following slight injury, and no headache after severe injuries.

The headache of tumor sometimes disappears for weeks, and even months, at a time, so much so that it often deceives one as to the presence of a tumor. The headache almost always disappears completely and permanently after removal of the tumor.

A severe headache occurring in the course of an Otitis Media, and not relieved within twenty-four hours after opening of the drum, is a grave symptom, and if continuous warrants the feeling that meningeal mischief is present.

After sunstroke, patients commonly complain for many years of severe recurring headache, whenever they come into intense heat or strong sunlight.

The recurring headaches of the menstrual period commonly disappear when the menses cease, excepting where there is a stormy menopause, when they are sometimes aggravated and persist on and off for a year or more.

Eye headaches are frequently made worse by the bright sunlight of summer, but this is not an invariable rule.

The cyclic recurring headaches that so much resemble true Migraine can be counted on to continue until late in life, when they gradually diminish, both in frequency and intensity. The neurasthenic head discomfort will almost always eventually disappear, but it will almost certainly recur when the patient has another nervous breakdown. In the latter attacks it will not be so severe, nor so constant. Always ultimate cure may be promised.

AGE IN RELATION TO HEADACHE

Headache in the Aged.—Headache is uncommon among the aged. One may reason that the tissues in the sinuses have lost their succulence, and do not approximate so readily as in young people; at all events it is not frequent to meet with real headache as a symptom in the aged, except as an arteriosclerotic headache, or when due to toxaemia.

Headache in Children.—Often diseases that are ordinarily painful in adults are not so in children. Persistent local headache in children almost always

means either organic disease, sinus or ear disease. Rarely one meets with manifest hysteria in young girls before puberty, as a cause of headache, but other evidences of this disease usually put one on the right track. It is quite true that the imitative spirit is quite strong in children, and they are apt to imitate their mother who has a head ache, by tying a handkerchief over their head, but if this is the case, the child when his attention is distracted, forgets the pain.

When a child has a real headache he shows it by a look of depression, by fullness or heaviness about the eyes; the under lid is especially notable in this respect. Laughing may make the contrast noticeable, but ordinarily there is loss of power of the orbicularis oris. This is best seen when viewed from the side. Adenoids are indirectly responsible for upwards of one half of the headaches of very young children.

Age.—In children acute headache is usually due, (1) either to gastro-intestinal conditions, such as constipation, or (2) the nose and throat, (3) infection, rarely to eye strain.

GENERAL PRINCIPLES OF TREATMENT

The treatment of Headache, just as the treatment of any other symptom, is but part of the treatment of the case. This symptom sometimes is, however, so insistent and so much in the foreground in many sick people that no matter what

the disease may be that causes it, an attempt should be made to relieve the headache at the first visit. In the treatment of any disease or symptom, one of the surest ways to encourage the patient is to relieve the presenting symptom or symptoms as quickly as possible, even though relief continues for a short period only. Unless he is encouraged he will not persevere in any treatment, and therefore a temporary prop is needed. Even in chronic headache it is advisable to give the patient prompt relief so as to produce confidence enough to continue the treatment.

In treatment of headache, due regard must be always had for the cause of the headache. In a general way however, there are certain procedures that are commonly followed by some measure of relief. Headache is unlike other symptoms in that if it be greatly lessened it is often quite bearable, and aside from some mental and physical impairment is not inconsistent with the performance of the every-day work of life. It must always be borne in mind that the psychology of having done something for the headache by its possessor, or by someone else, causes the condition to be accepted and in a measure forgotten. Anyone who witnesses the almost complete relief from head pain that follows the application of a handkerchief about the head, the use of a liniment, etc. must be convinced that once the psyche is satisfied that the best that could be done has been done; then forgetfulness

of the major portion of the pain frequently results, and unless the mind is recalled to the presence of the headache by someone else it passes into oblivion. One must not run to the conclusion that such a phenomenon is confined to those of the so-called neurotic temperament. It is quite consistently present in all of us. One notes this in the human behavior with regard to the slight aches, pains and itches in various parts of the body occurring spontaneously or after hitting the part; one rubs the part for an instant and the pain or sensation is relieved and forgotten. It would be difficult to visualize such a sudden disappearance of any real pathology.

In many instances where headache is complained of, the discomfort is so slight that few people will bother complaining to the physician of its presence; on the other hand the consciousness of such a discomfort, even of slight degree, aching continually, suffices to upset the nervous system of a none too stable person. For that reason, if for no other, one should take note of the complaint of headache.

An ice bag is grateful to most of those who suffer from a headache. If an ice bag is not handy shavings of ice wrapped in a towel and placed under the nape of the neck will suffice. This is especially useful in those who have fever. Contrary to current belief it does not lower the temperature. A hot mustard foot bath affords much relief in most

headaches. In localized headache a hot water bottle to be head is more agreeable.

Among local remedies that have been used from time to time, and that are useful, may be mentioned, (1) bathing the forehead with some cooling lotion, preferably by a solution with a pleasant odor, as spirits of Lavender, camphor or alcohol; (2) tying a bandage about the head is of service in cough headache. In the neurasthenic headache, and in many menstrual headaches, the inhalation of menthol and the application of a menthol pencil to the temples is especially efficaceous, both in those headaches due to the nose as well as in nervous headache from any cause. Dry cups to the back of the head frequently afford relief, particularly in the congestive headaches. Sometimes they are also applied over the clavicle or over the mastoid. Among foreigners the application of one or two leeches, particularly behind the mastoid, is regarded as a sovereign remedy, especially is this so in acute congestive headache from any cause. Natives seldom will have the patience to resort to this measure, and will prefer relief by drugs. The relief afforded by leeches in the headache at the beginning of a toxaemia is often very startling, and the relief persists for many hours.

The use of Croton oil locally, as a counter irritant, has well nigh disappeared as a remedy for chronic headache. Occasionally a blister of cantharides placed in front of the mastoid will afford relief in

a chronic headache. A seton applied to the back of the neck was a manoeuvre employed by the ancients for the relief of a chronic headache.

It is not my intention to decry the use of any or all of these agents, but rather to point out that their use is for the most part empiric, and the reason of their success is for the most part unknown. One might reason that the relief after the use of the menthol pencil and the liniments was due to the relaxing effect of the vapor on the nasal mucus membrane, thus causing an opening up of some cavity or cavities and releasing the vacuum, but just why they should be of service in a headache due to gastro-intestinal disturbances is difficult to see. The same is true of the ice bag, yet few will deny its great usefulness. The theory of Head and McKenzie that the result occurs because of blocking of the pain impulses, much in the same way that Cocaine, blocks pain impulses, in other disease, is at least understandable.

Household Remedies.—Among other household remedies may be mentioned a mustard plaster to the nape of the neck, hot drinks, strong tea, or coffee.

Purgative.—There are very few headaches of any kind that are not ameliorated to some degree by an active purgative. This is accomplished to some degree by an enema, but not nearly so actively as by a purgative. It may be assumed that this relief is due to a local derivative action by a concentration of the fluids of the body to the intestinal canal,

and by the consequent temporary lack of congestion in the head and brain. However, just why this relief acts so quickly or almost instantaneously when the rectal sphincter opens, is difficult to explain; there is even some amelioration following the passage of gas without a movement.

Ancient Remedies.—Among the ancients a number of remedies were used in the treatment of headache, that are now obsolete. Gelsemium was administered until the patient saw double. Cannabis Indica was used until the physiological effects were evident; yet these agents to-day have a very limited field of usefulness. Ergot, because of its power to contract smooth muscle fibre, was reintroduced as a remedy for headache by Livingston about twenty years ago; to-day it is rarely used. Its action in this respect is scarcely noticeable except when given as Ergotin by hypodermic injection. It has a limited field of action in the headache of Manic Depression, in alcoholism, and in some menstrual headaches. For the most part it aggravates the headache of Metrorrhagia and Menorrhagia.

Coal Tar Derivatives.—Medically a great advance was made in the treatment of headache by the discovery of the coal tar derivatives. Up to that time the only positive control of headache was by means of opiates. Now opiates are rarely used. It is an open question whether the coal tar derivatives by their lessening pain, if pain as such, of the whole

body, could be measured, have not done more to make life comfortable and agreeable than any other discovery of ancient and modern time, even surpassing the benefits of general anesthesia. At first sight this may seem preposterous, but if one considers the multitude of people who in the past and present suffer from headache and various pains of nerve origin in various portions of the body, who now find relief in these agents, then the claim will not appear so unlikely.

In the present treatment of headache one thinks at once, instinctively, of Acetphenetidin, (Phenacetin), the dose varying from five to ten grains repeated every three or four hours until the cause is removed. Early in the history of coal tar derivatives clinicians recognized that the addition of Caffeine improved the coal tar action. At one time it was thought to counteract the so-called depression and the heart weakness, which was erroneously ascribed to the coal tar derivative. Experimentally this cardiac simulating action of the Caffeine was found to be without value because the time of the action of both drugs are not simultaneous. The occasional so-called cardiac weakness and depression, cyanosis, etc. was found to be an idiosyncrasy due to the formation of Methemoglobin, and symptomatically noticeable by the patient in the region of the heart, because of the changed blood passing through that organ but not due to any weakening of the heart muscle as such.

About the same time someone added sodium bicarbonate to the prescription in dose of three to five grains, affording as it were another barrel to the already double-barrelled gun in the treatment of headache, the alkali neutralizing the gastric acidity which is so often a cause of headache. The proprietary manufacturers quickly noted the advantage of this combination, and added another barrel to the gun in the shape of a purgative, generally of the Phenopthalein or cascara group, which theoretically afforded relief and often cure in the same powder or tablet.

Anyone who knows the financial success of such proprietaries as Bromo Seltzer, Orangine, Phenalgin, etc. must realize that they have served many a sufferer as a surcease for his troubles. It is customary to decry the use of these coal tar agents with the statement that they are bad for the heart—that they are habit forming, etc. but as a matter of fact their occasional use is rarely a calamity. It is quite true that one should endeavor to find the cause of the headache, and attempt to relieve it, but many people would rather go through life with more or less frequent headaches than to follow the laws of hygiene that are often necessary to accomplish this purpose.

In some individuals, one of these coal tar derivatives is more successful than another. Acetanilid may be taken as a type; it formerly was much cheaper than the others, and this was a factor in

its popularity. A well known formula such as the Migraine tablet containing Acetanilid gr. 2, Caffeine gr. ½, Monobromated camphor gr. ½ is frequently an efficient, cheap and handy remedy for headache. Its chief drawback is the occasional toxicity, due to the Acetanilid. There are a certain number of people who bear any, or all of these coal tar derivatives badly, as evidenced by cyanosis cardiac depression, palpitation and weakness. Acetanilid is much more prone to produce these results than any other coal tar derivatives in general use. It should not be employed in dosage to exceed three grains, until it is ascertained that no ill effects follow its use in that particular patient. It is seldom advisable to give any patient more than five grains every three hours; its tastelessness is a point in its favor. Acetphenetidin (Phenacitin), has supplanted the other coal tar derivatives, because of its comparative safety. It is very rare that any evil effects are noted from ten grain doses of this drug, except in special instances. (See Migraine.)

Antipyrine, Pyramidon, Salophen, Aspirin, etc. are not generally as efficient as Acetphenetidin. Occasionally one of them does better than the others. The chief point of value of Salophen is its tastelessness. In rare instances Pyramidon is more efficient than all others. In some instances these Powders are made to effervesce, by the addition of effervescing salts. The insolubility of the Acetphenetidin prevents any large dosage of this drug,

when administered in this manner. The popular "Bromo Seltzer" is of this type.

Generally speaking it is better to prescribe the cathartic separately. It is the function of the practitioner to judge the character of the purgative best suited in the individual case, and this often requires much discrimination.

It is not always possible to ascertain definitely, the cause of the headache at the first visit. When such is the case, and unless there be some contra indication, the following prescription is useful as first aid in the treatment of all headaches. It is somewhat of a shotgun mixture, in that it fulfills the indications for the treatment of several of the commoner cases of headache.

Acetphenetidin..... gr. vii
Caffeine cit..... gr. iii or Guarana gr. v

One powder, to be repeated every three hours until relieved.

So then we have in this an efficient and safe anti headache prescription. One should write the chief ingredient in the pharmacopeial language as Acetphenetidin rather than as the trade name Phenacetin, and in our discussion it will always be spoken of as the first prescription to be given in any type of headache. There are a few, very few, conditions where it is not successful, and wherever in the body there are nerve pains this prescription will be found useful. The addition of the Soda bicarb with or without a purgative will depend on the indications.

Spinal puncture is sometimes used as a therapeutic measure for the relief of intense headache. It is especially of value when meningitis or some brain pathology is present. Frequent tapping in cerebro spinal meningitis is of great therapeutic service, and should be done regularly if very severe headache is present. In Meningismus from any cause it is indicated to relieve the severe headache, likewise in chronic Meningitis.

In the persistent headache of brain tumor it is the rule to relieve it by tapping. In other severe headaches, such as those due to heart disease and toxic headaches, much care must be exercised in advising this procedure. In Uraemia, after all other means have been tried, it is sometimes useful. One should always remember that not only is it likely to *leave* a headache after its use, but serious results may follow a large tapping. In no instance should one remove more than 20 c.c. of fluid. In the toxaemia of alcoholism especially, great care should be exercised, as immediate death, in a number of instances, has followed shortly after its use. This warning is uttered because latterly in hospital practice, it has come to be a habit to treat every severe headache by spinal tap. In private practice it should be done with much circumspection.

Much attention has been directed to the relief of headache by physical means, especially by dehydration. The injection of a 50% dextrose solution,

intravenously of course, by a process of dehydration, will theoretically lessen tension in the cerebro spinal fluid. As yet it has not been generally employed for this purpose. Weed and McKibben have shown that the pressure of the cerebro spinal fluid could be reduced by intravenous injection of concentrated solution of sodium chlorid (salt), and it was further proven that merely the ingestion by mouth of strong salt solutions reduced the C. S. pressure; in fact as a corollary to this, Cushing has shown that a saline given to relieve headache of constipation would relieve the headache often before the bowel moved. In general, sodium chlorid makes a good and safe salt for this purpose, if the patient's digestive apparatus will retain it. Recently Hugson of Baltimore has solved this problem by giving a salol coated tablet of fifteen grains. From two to three such tablets should be taken every five minutes, with as little water as possible, until eight or ten are taken. Relief generally follows in a half hour. Of course one would not do this if Nephritis were present nor in the aged. By animal experimentation a dosage of 15½ gr. of the salt to 1 Kmg. reduced the spinal pressure in amounts varying from 80 to 234 MM. Hugson believes that 2½ gr. per kilogram reduces the cerebro spinal pressure sufficiently and in any case presenting definite pathology, that such a measure is indicated. Bleeding is a measure preserved for severe toxaemias and for high arterial tension headaches.

The use of Bromides and other sedatives has been discussed elsewhere in this work.

Migraine.—Migraine, or Hemicrania, is a term used to describe a syndrome, which when fully developed, consists of an aura, usually with scotomata, followed by an intense headache, frequently unilateral, associated with nausea and sometimes vomiting; this attack lasts a varying period, from one hour to a day or more, recurs periodically, and always has a hereditary family history.

The unilateral cases are twice as frequent as the bilateral ones. Like all disease syndromes, the unusual cases far outnumber the classical cases, so that frequently the headaches may constitute the sole outstanding feature; more rarely the other symptoms may constitute the major symptoms. The disease bears much resemblance to epilepsy, because of the aura frequently present in both at the commencement, and the sleep so frequent at the termination of both. Many bizarre forms of both diseases do occur, and there is much evidence to show that at times one merges into the other; both are transmitted, and both recur periodically.

Description of the typical attack of Migraine: It usually begins on awakening, often with double vision, with a central scotoma, (dark area in vision which grows larger and larger, finally making it impossible to recognize people in the room); within about twenty minutes the headache begins over the inner right or left brow, a boring pain radiating to

the right or left side of forehead, and occasionally passing just to the left or right over the midline; any movement causes increased pain at the vertex; there is a superficial tenderness of the scalp; any emotion makes the pain worse; usually within half an hour nausea and vomiting begin. This makes the headache worse; this pain lasts on and off for from three to four hours or longer, when the patient falls asleep and awakes and is normal.

In some instances a part of one lateral half of the upper part of the head is the seat of very severe pain, which is occasionally described as of a boring or penetrating character, and may be so circumscribed that the painful spot could be covered by the top of the thumb. Sometimes the pain is situated immediately over one brow, the sensation experienced being like that which would be produced if a sharp and strong instrument was being forced into the head at that particular spot. The pain varies much in intensity, and somewhat in character, from time to time. It may last for a period of from twelve to twenty-four hours, or even longer. It may then shift to the opposite side, and, after persisting there for about twelve hours more, may gradually subside. In a short time the patient feels well, and perhaps for some days after the attack has subsided, considers herself unusually vigorous.

The pain is usually referred to the top of the head, and is complained of deeply within the skull. It is most commonly either supra orbital or over the gla-

bella. In some patients the complaint is comparatively slight, whereas in others it is maddening. It is a boring, bursting pain, as though the skull would explode. During the attack pallor is the usual facial finding. In many cases the aura consists in a tired, heavy feeling in the suboccipital region for a few days before the attack. The patient is often tired and languid just before the onset.

The stomach derangement in sick headache is often very marked and very distressing, and these symptoms are often preceded by an almost irrepressible tendency to yawn at frequent intervals. There is often a sensation apparently situated in the soft palate, which almost makes the person vomit, as soon as he has yawned once the desire to do so returns, and this often lasts for some hours, or until vomiting occurs or sleep is induced. There is, almost always, more or less nausea, and not infrequently violent vomiting, the depression accompanying the sickness being sometimes of the most distressing character. The vomiting is remarkable, for there is not merely straining and contraction of the stomach, followed by the rejection of its contents, but a great deal of secretion is poured into the stomach from the glands, and after this has accumulated so as to distend the organ it is suddenly expelled. After the removal of the contents of the stomach, which are often of an intensely acid reaction, the distressing nausea and sense of oppression and exhaustion are relieved for a time, but recur.

What is very remarkable in many of these cases is this: that food may be partaken shortly before the vomiting is excited, then an enormous quantity of acid fluid from the stomach is brought up and yet there is none of the food contained in the vomitus.

As to vomiting, this occurs in at least three-quarters of the attacks. Occasionally in the early stages of the disease, nausea and vomiting is the outstanding feature. In England this is termed "sick giddiness," or "sick headache." Frequently the onset of the vomiting ends the attack, and for this reason the patient ascribes the headache to the attack of stomach indigestion. ("Sick" is a common equivalent for nausea in England.)

The association of nausea and vomiting causes the patient to feel that something she recently ate was the primary cause. She seldom associates the headache and the vomiting as common symptoms of a cerebral disorder.

The salivary glands, the little labial and buccal glands, are also affected. Saliva is very sparingly secreted, and the mouth is often for a day or so in a clammy and uncomfortable state; the mucous membrane dries very quickly; there is often a very unpleasant taste, and instead of the mucous surface being soft and moist it seems to be besmeared with viscid mucus, and the patient will tell you her mouth is quite out of order. In many cases the action of the salivary glands is certainly suspended for a time, and when the attack is passing off, one of the

first points noticed is the pouring of a quantity of saliva into the mouth.

During the attack the surface of the liver is sometimes tender to the touch. Not infrequently there is a feeling of fullness or actual pain in the right side; and often there is distinct yellow cast of the skin and the conjunctiva. Sometimes there is a very distressing faintness, and a feeling of terrible exhaustion, the heart's action being often very feeble for a time, and sometimes so very weak as to cause alarm.

It is remarkable that, after all of this disturbance the individual who has suffered should following the attack be for a time at least in better health than usual, and she may feel exceptionally well and vigorous.

There is clearly a temporary disturbance in the brain itself, probably in connection with the vessels at least of the surface of the gray matter of the convolutions, for not only does the pain seem to be situated in the brain, but the action of the cerebral matter is unmistakably disturbed. The memory is for the time impaired. Attention cannot be given without conscious and even painful effort. Sustained thought is impossible during the attack, and there is a decided longing for mental rest, which, being yielded to, soon results in dozing, or in actual sleep.

The disturbance of the nervous system in sick headache is so striking and widespread, that now-a-days pathologists have been induced to place sick

headache among nervous diseases, and to support the conclusion that the derangement not only begins in the nervous system, but that the affection is exclusively nervous.

A considerable quantity of urine, often rich in urea and urates, and of high specific gravity, is voided, and this is succeeded by the free excretion of large quantities of pale urine containing a small proportion of solid matter.

Someone has said that it is a disease of the more cultured classes. On the whole this is true, and there are more intellectual persons afflicted with it than day laborers. It is not uncommon in the poor, but those so afflicted realize that it acts as a liability, and strive to better their position as a result.

Occasionally it begins late in life, say between thirty and forty years of age, but one must always scrutinize such cases. When a syndrome similar to the above first appears after fifty, one must first rule out Syphilis. Sometimes it follows the infectious diseases; Typhoid, Scarlet fever, and Influenza. Emotional disturbances are sure to bring on the attack, as well as sexual excess and hard work. Constipation and menstruation have been suggested as causes of the manifold symptoms. Barometric changes seem in many instances to be related to the onset of the attack, particularly in women. The disease subsides about the menopause, and becomes infrequent thereafter. Likewise in men it subsides with the lessening of virility.

The frequency of the attack is not regular; that is, there is no definite time when it may be expected, but in a general way in each individual there is a more or less general schedule of attack, in some, one or two attacks a week, in others one in a month, and so on. Like all recurrences, they are in women more common at the time of either ovulation or of menstruation. Statistically it occurs among males in the proportion of one to four of females. In our experience it is very uncommon among males, and is more irregular in its course.

This problem of differential diagnosis is further complicated by the fact that the family history in many cases is equivocal, either a history of epilepsy or of Migraine, or often both, in the family history. In at least 75% of the cases there is a distinct hereditary history.

It is good practice to with-hold a positive diagnosis until one sees the patient a second time, and secures the second history, which is always so much more correct than is the first story told by the patient. The patient often translates a real convulsion as a fainting attack. In arriving at a conclusion one must remember that the Migraine attack varies from year to year. At one time the complete syndrome may be present; a few years later perhaps the nausea will have disappeared, and again at a later period all of the other phenomena except the headache will, on manny occasions, have vanished.

Occasionally there may be a single attack showing several of the usual concomitants. It is quite rare to have the attacks remain classical throughout. Now, on the other hand the petit mal attacks are more apt to develop into grand mal than the other way about. The petit mal attacks are usually followed by a dull headache, and are generally much the same throughout life.

As a rule most patients date the onset of the attack of migraine to a time in the waking hours. During the preceding day, or at most a few hours previous to the attack, there are certain prodromal symptoms commonly but by no means always present; such as weariness, digestive upset, anxiety and scotoma. This latter is the so-called ophthalmic form of migraine, in which a visual aura occurs. Lightning-like sparkles appear on a dark background, sometimes involving only half of the visual field. Such symptoms last a varying period up to an hour. This ophthalmic form is present in this country in considerably over half of the patients, and in a still large proportion in France, and much less so in Germany, the mental makeup of each nationality undoubtedly constituting a factor in these percentages.

Among other aura may be mentioned paraesthesias of various kinds and even transitory aphasia. The resemblance of these phenomena to true epileptiform convulsions is quite readily seen. It entails considerable doubt in any case where a patient has

this temporary aphasia, followed by headache, whether one is dealing with an attack of petit mal followed by the usual post epileptic headache, or whether it be considered merely an aura of a migraine attack. During the attack the pupils are usually contracted, and the pulse rate is unusually slow. Disturbance of the special senses frequently occur. The stoppage of peristalsis during the attack as demonstrated by X-Ray offers much food for thought.

There is no doubt that the tendency of the sick headache is to diminish in severity as age advances; so that many who are martyrs to frequent and severe attacks up to the age of thirty-five or forty, begin to improve after that period, and become troubled less frequently, or recover altogether. In others, the attacks become rarer, but occur now and then as long as life lasts.

As to causation, the older English writers ascribed it to Gout. In a country where every person was said to have Gout, this was an easy transition. The same reasoning would persuade one in a malarial country to ascribe it to Malaria, and this has often been done. It is a disease much more common among some races and peoples than in others. It is notoriously common in northern races, especially amongst the English and in the peoples about the North Sea. As a possible explanation the shape of the skull of these people may be suggested. The present most commonly accepted theory, (and theory it must be) predicates that the headache is

presumably associated with periodical swelling of the pituitary gland. When the pituitary fossa is larger, and the pituitary meets no resistance in the course of its physiological swelling, headache does not result. In some instances other equivalents of Migraine result. If however there is a complete, or nearly complete enclosure of the pituitary fossa, pain results from the pressure exerted, which ceases when the swelling of the pituitary ceases. This reasoning is in line with periodical swelling of other endocrine organs, and satisfactorily explains (1) the recurrences, (2) the inheritance, because it is fair to assume that the form fo sella tunica is inherited in much the same way as is the case with the form of skull, color of pupils, etc. Its cessation at the menopause in women would indicate, (1) the reason of its periodicity, and the relationship which it is acknowledged exists between the ovary and the pituitary.

The theory that has hitherto been accepted is that of Brunton. It supposes an acute closure of the foramen of Monro. This closure produces a distention of the ventricles, because of the fluid that is secreted by the choroid plexus. Any temporary congestion of the edges of the foramen, due to change in the blood, suffices to close the mouth of the foramen. The swelling in the ventricles presses the brain against the dura. This in turn irritates the termination of the fifth nerve in the dura, and is responsible for the temporary brain-tumor-like

symptoms of the syndrome of Migraine. When the foramen opens the symptoms as quickly disappear.

It was thought that the differences in the symptoms of the attack depended on the extent and location of the pressure.

According to this theory, the hereditary tendency is due to the hereditary tendency of certain families to have leptomeningitis or other similar inflammatory changes that may obstruct the foramen. It seems a rather long fetched view that the disease of the meninges should follow so generally or that it should affect the girls in preference. The intimate relation existing between the pituitary and the ovary make it far more likely that the first theory more nearly explains the cause. In children when these meningeal changes are common, Migraine is rare, whereas the disease does not as a rule begin until the ovary begins to function.

Some years ago, the theory that the disease was due to uric acid was very general. As the result of a catchy book by Hay, it was very popular. Lichty in a carefully planned experiment, definitely proved that the uric acid and urea in the urine and the blood were diminished during the height of the attack. After the headache the urea remained the same as before the onset, while the uric acid out put was much improved. So that while the uric acid wave is immediately associated with Migraine, it does not appear until the latter part of the attack, and is really at its height when the attack is passing

off, so that the uric acid increase is a result, and not the cause. It is due to the digestive upset accompanying the attack.

In treatment Lichty fed one group on vegetables and cereals; at another time he fed them a milk diet; another time on mixed diet, with meat two or three times a day. In no case was there any evidence that diet was of the slightest importance the bad attacks coming on a milk diet quite as often as on a mixed diet.

As to older theories, these varied from the view that a superabundance of bile was the cause, or that it was due to dilatations of the blood vessels of the brain. Some assumed a vaso motor cause, others a sympathetic cause; others have suggested it as an anaphalactic phenomena, analogous to what occurs in the skin, as in Urticaria, producing an exudate and consequent edema of the nerve bundles, which disappears almost as suddenly as it appears.

In spite of this almost continual disorder, the general phenomena of the system, essential to the continuance of life, proceed as usual. It seems that many of those who suffer from this complaint, and who take moderate care of themselves really enjoy certain advantages as regards the prospcet of longevity.

The diagnostic criteria of Migraine is a headache with the following characteristics:

(1) Inheritance
(2) Beginning in youth
(3) Periodicity

Unless all three are present in any case one may well doubt the diagnosis. It is with the so-called bilious headache that confusion may arise. This bilious headache is a common complaint in the South; it is commonly associated with vomiting, and occurs more or less periodically, depending on the varying appetite of the patient. It is commonly associated with over-eating, particularly of fried foods. It is more common in women, but less so than is Migraine; is almost always relieved by purgatives; involves both sides of the head, and is not ordinarily hereditary.

Such patients have pain over both temples, and clasp the head between the hands, or tie a handkerchief in the form of a band about the head. Shaking the head causes no increase in the pain, but any pulling of the hair is painful. There is a superficial as distinguished from deep tenderness of the scalp, and this is therefore due to a referred pain. Such patients usually have a slight icteroid tint of the conjunctiva, and during the attack have a white coated tongue, looking like milk which has remained on the tongue; have foul odor to breath, and usually a strong trace of Indican in the urine. Of course such patients may be victims of Migraine as well, and it is often with a sense of diagnostic satisfaction that one makes out that there are two kinds of headache present. Here the headache is not so regular, and is usually general rather than one sided, as it is in Migraine.

Cyclic vomiting in children bears many resemblances to Migraine. It is true that in children it is often difficult to properly assess a headache, but the other symptoms seem to run true to form: (1) the regular recurrence, (2) heredity to some cyclical phenomena, (3) quick return to normal.

Tabes.—Mistaking fruste forms of tabetic crises for Migraine should not occur if one remembers that such headaches do not occur for the first time, as a rule, until middle life.

Trifacial Neuralgia.—Paroxysms of tri-facial neuralgia differ in that the duration of time of pain is momentary, and is not associated with vomiting, and is not inherited.

In arriving at a conclusion one must always remember that Migraine frequently changes its clothes, often taking off one and then another of its attendant symptoms, so that in fifteen or twenty years there may be nothing left but the headache; so that one must always inquire closely into the past history.

Glaucoma.—In Glaucoma the attacks come at intervals, are very severe, and are accompanied by scintillations, and by vomiting. However, the scintillations do not immediately precede the attack, but are present more or less in the intervals; the patient usually has some rise in blood pressure and there is some dimness of vision. Unfortunately when seen for the first time the patient is usually in a dark room, because he dislikes to look at the light,

and it is easy to miss the steaminess of the cornea, the narrow anterior chamber of the eye, and the stony hardness. It is to be remembered always that any Migraine beginning after thirty years of age, or even after twenty, merits the most complete and thorough examination in an endeavor to find another cause.

Dietls Crisis.—Strange as it may seem, a complex closely resembling Migraine, occurs in Dietls Crisis. The nausea and the vertigo appear first, and then the headache, which, while not severe, is quite troublesome. Here again, the reversal of the order of the symptoms, the age of the patient being usually over thirty, calls for a question mark on a diagnosis of Migraine. In such cases there is always on close examination some lumbar pain and urinary disturbance.

Syphilis.—Syphilis occasionally produces a severe unilateral headache, accompanied by vomiting. The age of the patient should suffice to suggest some other cause than Migraine. Any Migraine beginning after thirty years of age, not otherwise accounted for, should be given the benefit of Mercury and Iodid.

Brain Tumor.—Here the symptoms closely resemble Migraine, but the greater constancy, greater severity, and the optic neuritis, are sufficient to differentiate. It is true that the presence of attacks of headache and vomiting, in the absence of a previous history, frequently suggests cerebral

tumor; at the same time any movement aggravates the pain, and there is great sensitiveness to all kinds of stimuli. In the tumor cases, the slightest percussion is painful over the sensitive area. The pain is more or less localized, and is then followed by violent vomiting. In Migraine, over some areas, the scalp is often extremely tender to touch, but there is absence of choked disc. The age of onset is also strongly suggestive.

Treatment During an Attack of Sick Headache.—When the suffering is very great, and particularly in cases in which there is a distressing feeling of nausea, and frequent or occasional attacks of actual vomiting, the patient must lie down.

The one who is suffering from an attack ought to starve for the time, and thus rest the stomach until the attack passes off. It is very remarkable that many who suffer from this troublesome disorder are able to discharge even active duties without taking any food at all for perhaps twenty-four hours or longer, although in ordinary health the same person would become faint, if while fasting he attempted to do the same amount of work.

Most migranous people are sensitive to some dietary idiosyncrasies. Nearly all of them are to some degree sensitive to fats, eggs and milk; a less number are sensitive to proteins, and a still less number to sugars. It may well be that one can get a clue by finding if there is any food idiosyncrasy on the part of the parents. In those who suffer from

flatulence, with fermenting stools, it is often advisable to increase the sugars and lessen the other constituents. In those with light colored clay stools occurring a day or two before, proteins are sometimes the cause of the attack.

As to whether the activating agents is the fats, sugars or proteins, each case must be studied separately. In most cases it is well to omit eggs and fried foods in general. Many observers feel that starches and sugars are often the offending agents. After omitting the fats, and no relief, then she should have a sugar free diet, almost as strict as a diabetic; on the other hand not a few feel that a protein free diet is best.

During the attack if the patient objects to starvation from the fear that she will lose strength, one may advise her to use a little mutton broth or beef-tea, which should be entirely free from fat, and should it be sipped. Of course, as far as any real advantage is concerned, she might just as well take water, for the little food that is introduced under these circumstances cannot in any way help nutrition; a biscuit for lunch, and a small chop, with bread pudding made without sugar, for dinner, and a cup of arrow-root water or postum for supper, or with no supper at all, is sufficient. It may be advisable to suggest that she walk so many miles, rise at a certain hour, and retire at a time when most people consider the hour for harmless enjoyment has arrived, but few of the present generation will listen to this prison-like fare.

In giving advice one must remember that we do not know enough about the real nature of the malady to justify us in accurately and arbitrarily laying down the law of living, and secondly, experience has incontestably proved that persons who suffer from sick headache get on better, upon the whole, if they live fairly well in the intervals, and starve for the short period during which they have to suffer.

Some of those who suffer from this unpleasant affection can tell, some days before the derangement begins, that they are about to have an attack. Now, if the patient, by whom the import of these premonitory symptoms is understood, will take two or three grains of calomel, and follow it by a saline the following morning she may completely escape the impending attack. She may feel more or less out of sorts for a day or two, but sometimes she does not get the severe headache, and she may not vomit, though very likely she will experience a slight degree of nausea.

Exposure to cold often precipitates an attack of sick headache if one is about to come on. Indeed, many sufferers attribute the illness to the direct influence of cold. Sick headache is certainly relieved by warmth. A warm bath sometimes removes the headache, and almost always gives relief for the time. In slight attacks of sick headache complete relief may be obtained by putting the feet into hot water, or even by simply well warming them before a good fire. An ordinary hot water bottle to

the feet and a hot water bottle half filled with hot water and applied to the stomach, sometimes appears to be of use, and is at any rate very comforting under the circumstances.

The patient should have, if possible, plenty of rest, eight to ten hours sleep daily; frequent meals, slight in character. In general at the first visit it is well to order a vegetable diet. The excessive use of coffee and tea must be avoided. Alcohol is always bad. There is not much evidence that tobacco is harmful.

One should be careful not to promise too much by any form of diet. Life in the country and the hills has seemed to the author preferable to life at the seashore. A bracing climate, high and dry, is to be preferred. When the attack is not severe one should endeavor to get along without drugs. Bromides constitute by far the best medication. When the first signs of the aura appear, one should take sufficient bromide to relieve the impending paroxysm, say twenty to thirty grains at one dose, or from sixty to ninety grains during the day. This is often to be continued for weeks, and possibly for months at a time. This course may be repeated several times a year. During the attack the bromides are less useful. Then one must resort to a coal tar derivative. Each person will find the particular one that agrees best. Usually Aspirin is fairly efficacious; in others Acephenetidin, ten grain doses, or Pyramidon, grains seven, or if the stomach is much upset Salo-

phen in ten or fifteen grain doses. In Europe Migrainine is most commonly successful. In my experience it is more apt to induce cyanosis than the others, but is nevertheless very efficacious.

These medicines should always be given on a partially filled stomach, using black coffee as a preliminary stimulant. If the head is hot and the body and feet are cold, then one should put the body in a hot bath and apply cold to the head. On the contrary, in other cases, the head is cold and pale. Here heat to the head, and occasionally cold to the body, is indicated. Continuation until the menopause is the rule. When the attacks continue well past the menopause, the query always crops us, is this Migraine, or a symptomatic Migraine, due to some other cause.

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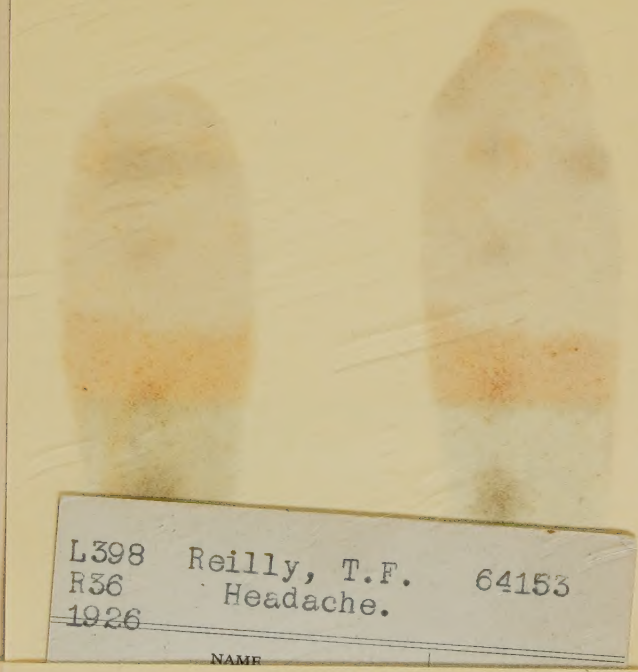

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